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ABSTRACT

This document is based on the results of a workshop held at the Reinhardswaldschule, Kassel, Germany in 1970; the workshop was attended by 52 participants from 14 countries who discussed "The Curriculum from the Eighties and Onwards." A framing principle for this report is that in place of the American emphasis on method in teacher education, teaching/learning systems should be seen as a whole--as a combination of teacher, methods, substance, and materials. The report is divided into six chapters on the following topics: factors to be taken into account in constructing a curriculum for the 1980s; the implications of changes in subject fields (specific fields that are discussed include mathematics, science, native language, foreign language, humanities and social studies, and physical education and expressive arts); the implications of new teaching/learning methods and the systematic approach to change; implications of curriculum change for the school and the community; and the problem of evaluation. The report concludes that framing a curriculum for the 1980s cannot begin until consideration has been given to changes in society that are likely to influence schools. (JA)

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Centre for Educational Research and Innovation (CERI)

THE NATURE OF THE CURRICULUM FOR THE EIGHTIES AND ONWARDS

Report on a workshop held at the Reinhardswaldschule,
Kassel, Germany
from 29th June to 4th July, 1970.

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1972

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EDITORIAL NOTE

All participants at the workshop contributed to this report in that it is primarily based on the results of their discussions at Kassel. Our thanks are due to Mr. George Taylor, Teaching Fellow at Leeds University, who edited the report on the basis of a draft prepared by Mr. D. C. Thomas, a staff member of CERI, and Mr. R. A. Becher, Assistant-Director at the Nuffield Foundation.

PREFACE

There is a point of view about education which argues that the subject matter of what is taught - i. e. the curriculum - is less important than how it is taught - i. e. pedagogy. Such an attitude is increasingly prevalent in some OECD countries today, and in particular in some European countries which appear to have been slow moving and conservative in adopting new teaching methods.

However, the experience of countries such as the United States, where a philosophy of education emphasizing the importance of pedagogy has taken strongest hold, probably justifies some suspicion of this dichotomy between substance and method. Indeed the historical experience of such countries appears to have been that to emphasize method at the expense of substance may result in a decline in the quality of teaching. Is there not a simple maxim to be taken to heart: that the intellectual quality of the teacher cannot be sustained without a deep concern with the substance of what a child is supposed to be learning; and without such intellectual quality, pedagogy tends to become a glove without a hand?

The report therefore quite rightly includes in its scope "teaching-learning systems" seen as a whole, that is to say as a combination of teacher, methods, substance and materials. It argues that all these aspects must be modified together if educational change in the classroom is to be effective. There is an important implication of this approach: it is that the teacher has to be seen more and more as a skilled manager of subject matter, techniques and materials, all centred on effective learning by the child. It follows that the teacher - even if his skills are changing - is central to the whole process. And it is for this reason that necessary prominence is given to the role of the teacher in preparing and executing curriculum changes in the schools.

All this is no doubt true, but we cannot escape the reality that curriculum change also involves parents and the community at large. Further, the curriculum is the most sensitive aspect of educational change because it clearly reflects social attitudes and values. It is the point on which the traditionalists and the progressives are most clearly at loggerheads - they see it respectively as the bulwark of tradition and the touchstone of change. The teacher, caught in the crossfire, tends to be seen as an irresponsible modernist or a stuffy defender of the status quo.

One further merit of the report is that it takes some of the heat out of this conflict by demonstrating that there are common problems and trends in curriculum development in all OECD countries. Whilst there is no sense in the search for a common curriculum as such (for the diversity of culture between and within countries is a strength rather than a weakness), the Kassel workshop clearly demonstrates that there is much common ground. It also demonstrates that, even if a "technocratic" approach to curriculum development is to be avoided because of the social and human values involved, it is nevertheless true that in the last 20 years something like a body of technical knowledge on methods for changing the curriculum now exists. The exchange of this experience between Member countries will continue to be an important priority in CERI's programme of work.

J. R. Gass
Director,
Centre for Educational Research
and Innovation

INTRODUCTION

The following report is based on the results of a workshop held at the Reinhardswaldschule, Kassel, Germany, from 29th June to 4th July, 1970. It was attended by 52 participants from 14 different countries* who discussed "The Curriculum for the Eighties and Onwards".

The work, which was carried out in small groups, covered the following areas:

1. A close examination of changing goals and objectives the methods of determining and classifying such changes, and the broad implications of such changes. Taken from the point of view of pressures from outside: societal, economic, political.

2. As for 1, but taken from the point of view of pressures from inside: the teaching profession, the educational establishment, and the students.

3. An examination of the areas of major change in subject content: introduction of new, dropping of old, radical changes of content within a subject, and integration of subjects.

4. An examination of the areas of major change in method and the new systematic approach to such change: questions of individual and independent work, small and large group work, use of new media.

5. Changes in the institution, the school, arising from new concepts of curriculum: styles of government - authoritarian, participatory, grouping of children, organisation of time.

* See Appendix I (List of Participants and Countries).

6. Changes arising from new concepts of curriculum in the initial and in-service training of teachers, headmasters and advisers, and administrators. To include also the training of curriculum developers.

7. The organisation and methods of making curriculum development at national, regional and institutional levels. This should include not only the organisation of the total system but detail on the nature and procedure of curriculum development teams.

8. Strategies needed for the introduction and acceptance of curriculum changes at all levels.

9. Changing methods of student assessment and methods of appraisal of the success of curriculum change.

I

FACTORS TO BE TAKEN INTO ACCOUNT IN CONSTRUCTING A CURRICULUM FOR THE 1980s

Owing to the growth in importance of education, the political, economic and social forces which currently influence the curriculum* will almost certainly continue to operate with greater intensity in the 1980s. In terms of numbers involved, cost of plant installed and the amount of capital invested, education will be even bigger business than it is today. More students will stay longer at school, consequently students will form a larger proportion of the population: in some Member countries they will enter the polling booth soon after, or even before, they leave the classroom. Simultaneously the rate of social change will accelerate: mass media will become more influential: new patterns of authority will emerge and leisure time will be extended as the length of the working day recedes.

The school cannot remain aloof from these developments. Teachers, individually and through their professional organisations, will wish to redefine their role in face of these external pressures and will themselves be affected by social changes. The students, who are maturing earlier, will wish to participate more in decision making.

Political factors

It would be tempting to argue that education should be taken out of politics, but education is too important to be left entirely to the educationists. An electorate will expect political parties to clarify their general educational aims and policies which concern broad social issues. Governments can and should expect cooperation form educationists in implementing nationally-accepted aims and carrying out nationally-

* In this report, the term 'curriculum' is taken to mean all the learning experiences provided by the school.

endorsed social policies. It is educationists, however, who should have the responsibility for making syllabuses, devising courses, evolving suitable approaches and encouraging innovation in the curriculum. How educationists, particularly teachers, discharge this responsibility will inevitably depend on the degree of centralisation in the educational systems of Member countries.

The Workshop identified as an example of an important political factor the movement towards equalisation of educational opportunity: it is expressed in the form of a demand by social reformers for the introduction of the comprehensive school. Although the insistence of the demand varies from country to country, all European school systems are responding in one way or another to the political pressures for greater equality of opportunity and for less specialization.

Economic factors

The contemporary scientific and technical revolution is causing startling changes in the working life of modern men and women. Inventions and techniques are radically altering most branches of industry and commerce; traditional craft skills are being replaced by machines operated by semi-skilled workers: new skills are demanding a background of scientific knowledge: automation and the computer have eliminated many routine tasks. In this situation it is impossible to anticipate what konwledge or skills will ultimately be most useful to students. The skills of the last decade are not identical with those demanded in the present decade whilst the skills required for the 1980s are not yet known. All that is known for certain is that most people will be subject to rapid change within their working environment and that the work force of the 1980s and beyond is likely to change jobs several times in a working life. Moreover, the volume of knowledge is increasing so quickly that we can teach only a diminishing proportion of it in schools. In some subjects, notably the sciences, the speed of advance has left school curricula twenty or thirty years behind the times. Curricular renewal, which will of necessity be a continuous process, must therefore concentrate on students' attitudes to learning, and on techniques that will enable pupils to continue their education in adult life.

In the 1980s industry and commerce will look for men and women who are capable of adapting to changing tasks and who are willing to relearn and retrain. It will be vital to foster intellectual curiosity and the development of a capacity to acquire knowledge independently. Whereas in the past teaching could be described as a process of communicating knowledge, of encouraging pupils to acquire prescribed information and of testing their success in doing so, it is now apparent that the urge to ask questions and the willingness and the ability to find answers is more important than the acquisition of factual knowledge.

During the last twenty years education has been affected by the demands of industry, commerce and institutions of higher education for a greater depth of knowledge in a smaller number of subjects. This specialization, often excessive for able pupils, has been achieved at the expense of general education. But ultimately, general education is likely to prove more important than those short-term requirements which have led to an over-emphasis on the examinable aspects of the curriculum. The social implications of the various disciplines have been neglected, especially in the case of the sciences - and this despite their profound effect on society.

Current changes in industry are, however, likely themselves to contribute indirectly to educational improvement. New technological and managerial skills, suitably adapted, can lead to greater efficiency in the processes of learning. The development of learning resources and learning systems will make possible more independent learning: management techniques will suggest better ways of deploying teaching and non-teaching staff and of resource allocation. As the mounting cost of education becomes realized by the tax-payer, he will expect to know whether he is receiving value for money; so educationists must also be prepared to cooperate in studies of cost effectiveness.

Factors in society at large

Patterns of authority are changing and the traditional sanctions are disappearing; parents, teachers, politicians and clergymen no longer automatically command respect. Student mature earlier and are more affluent; they are becoming aware of the contrast between the standards accepted and practised at school and those they know to exist in society at large. Through their contacts outside school, through the mass media (which will increasingly command attention, provide information, form desires and influence judgments and opinions among young people), they realize that issues can no longer be as simply defined, and as simply dealt with, as they were in the traditional treatment of moral education.

To develop this point briefly, many agnostics and christians find themselves in agreement on moral questions. The dividing line on many issues seems at present to run through the middle of the agnostics rather than between christians and agnostics. Many people, for instance, irrespective of their religion and philosophy, still accept sexual morality based on chastity before marriage and fidelity within it; but an increased proportion of people, certainly younger people, tend to regard sexual behaviour as a matter for individual taste and discretion provided only that the interests of third parties are safeguarded. It is important to remember that views of this kind are widely held by men and women of high integrity and of considerable moral sensitivity on many issues on which the conventionally moral are often apathetic.

Society has been transformed from the relatively simple and stable community of earlier times into a vast complex in which it is easy for the adolescent to be lost. In consequence there is a need to extend the scope of education to include social education with an emphasis on guidance. It seems likely that, for reasons of economy (the bigger the school the cheaper) and efficient deployment of staff, education will be centralized in larger secondary schools. In this situation the need to ensure adequate personal attention for every pupil becomes more acute. Young people are subject to stresses which did not affect previous generations. The mass media have made them aware of matters about which formerly they would have known little or nothing. The removal of certain fears and sanctions has made it easier for young people to assert themselves and to challenge authority. The natural tendency for youth to rebel is aggravated by the gap between the generations which has in its turn been widened by rapidity of technological and social change. In the past, respect for cultural, social and moral sanctions helped to bridge that gap. These sanctions have disappeared and nothing has replaced them.

Social factors in the school

The effects of such continuing social trends on curricula and school organisation should be encouraged to take part in decision making in the school: teaching methods should be pupil rather than teacher-centred: the habit of independent study should be cultivated and opportunities for such study should be provided. If it is accepted that knowledge is not a commodity but an activity, teachers will concentrate not on training their pupils to respond to questions to which the answers are known but on teaching them how to approach problems which are likely to arise in the near future. Teachers, therefore, cannot for long continue to regard themselves as fountains of all knowledge.

School discipline is likely to be affected by this change in the role of the teacher. With a curriculum designed for active learning, the disciplinary problems which arise from boredom will decrease. Incidentally, in the light of experiments on making pupils responsible for breaches of discipline, it would appear that other behaviour difficulties may need to remain in the hands of adult staff.

In modern society nobody needs to spend the whole day at work, and there is every likelihood that the amount of leisure time available will increase. Leisure can be a source of great enjoyment, but it can also spell extreme boredom leading to anti-social behaviour. It is to be hoped that a growing number of people will attain such a degree of job-satisfaction that the distinction between remunerative and leisure activity will be hard to define. As working conditions improve, the differences between the working and the leisure environment may become less

oppressive. Nevertheless, for many people 'leisure' will remain distinct from 'work': for them the Aristotelian view is still valid that people work in order to enjoy leisure. It is therefore a major responsibility of the school to enable young people to realise their own capacity for obtaining maximum satisfaction from leisure occupations.

Curricula will need to include as wide a selection of pursuits, both outdoor and indoor, as can be arranged, so that each pupil may find something to arouse his enthusiasm. The activities in school are likely to succeed only in so far as they are based on the individual interest of the pupils. But schools should educate students to exercise some degree of discrimination in their choice of entertainment, and should encourage them to adopt active rather than passive attitudes to the mass media of entertainment: cinema, television and pop music. Students should at least be 'exposed' to other forms of entertainment e.g. theater, opera and classical music. The object must be to maximise effective and satisfying choices by the students when they become adults.

It is recognized, of course, that the traditional subjects can provide interests which students will take up for their own sake when they have left school, and teachers would do well to re-examine their subject goals in that light. Nor should preparation ignore the deep sympathy which many adolescents feel for the handicaps and infirmities of others, and opportunities should be given to them for service to the community.

With the recognition that education should be available at all levels and at all stages of life as envisaged in this chapter, the old apothegm that school is only the beginning, not the end of the business of learning assumes new significance. It implies that children and parents will have to realize that schooling is only the initial stage of education.

The need to harmonize national educational systems

The movement towards internationalization can be expected to develop more by the 1980s. There is increasing contact between countries through tourism and the mass media of communication; there will be a multiplication of commercial and industrial links through the Common Market. This requires more than merely an increase in the knowledge of what has taken place in other countries, more than frequent visits by individuals abroad and more than international conferences. It necessitates access by school leavers to foreign universities, the recognition of equivalence between different countries of educational and teaching qualifications, international cooperation in curriculum innovation, and perhaps even exchange of groups of children (and occasionally teachers) between schools of member countries during term time. Internationalization would also require a review of modern language teaching. As

suggested in the next chapter, larger countries need not necessarily attempt to provide generally for the teaching of several languages. What is required is the widespread adoption of new and improved methods of modern language teaching for communication and understanding. The study of a country's language should also include some study of its history, geography and culture.

Universities

Because university education is seen to be a passport to higher remuneration and status, universities exert a direct and profound influence on the curriculum of schools; courses for senior pupils are generally geared to entrance qualifications. It follows that curricula for younger pupils often reflect this influence, even when a significant number of them are unlikely to seek higher education. As a result the secondary school curriculum is biased towards the academic side, with a corresponding diminution in the prestige of other equally important aspects of education. Only by consultation and cooperation between schools and universities over university admission can this distortion be rectified. A side effect of such consultation could well be an opportunity for schools to assimilate more rapidly the advances in subject content made in university departments.

Examinations

In secondary education the influence of examinations has increased, is increasing and ought to be diminished. The abolition of selection at the end of primary education has proved to be a liberating influence on the curriculum in the primary school, where it has become easier for teachers to concentrate on the needs of the individual pupil. National certificate examinations still impose considerable restraints on curricula in secondary schools. By giving undue prominence to those aspects of education which are examinable, they fail to encourage other important aspects of education which are non-examinable, such as emotional development, social education and leisure-time activities. Examinations appear to feed on themselves. The entrance qualifications for subprofessions make demands in subjects that bear no relationship to the needs of their job. In any case such researches as have been carried out point to the conclusion that examinations are a very inexact predictor of future success either in higher education or in subsequent life. It is not without significance that computer-based industries are discovering that their best employees are not necessarily those who have been trained in mathematics and science.

The influence of examinations would be diminished if they were supplemented or perhaps replaced by profiles prepared by teachers and

based on the evidence of continuous assessment in the schools. Attainment in individual subjects can be adequately recorded on the profile by a multipoint scale with the standard externally moderated by small scale national examinations. To make the profile more informative, comments on pupils' personal qualities could advisedly be included. It might well be that the use of profiles instead of examinations would be unwelcome to industry and commerce, which, like institutions of higher education and professional bodies, have come to rely upon examination results as a basis for selection. There is a case for urging employers to place greater reliance upon interviews and aptitude tests in their recruitment of staff. This would tend to reduce the role of the school as the gatekeeper of society: if schools ceased to be occupational selection agencies they would certainly become more relaxed, more pleasant, and more educationally effective.

Teachers

Teachers should be more closely associated with curriculum makers, both because they are the people who possess the appropriate professional training and because they have to put the curriculum into practice. (Incidentally, it seems likely that their status in society will rise with the international shortage of teachers and the increasing importance of education). But this does not always mean that they will be a pressure group for innovation. They have many reasons for being unwilling to change their approach, not least because they have an investment in knowledge and skills which tend to be devalued by the passage of time; they face the natural human temptation to resist any change which may render their stock in trade obsolete. Secondary teachers, because they are subject-centred (and, therefore, perhaps less sensitive than primary teachers to pupil needs) tend to be more conservative. Under the traditional school system the secondary teacher's isolation in the classroom is not calculated to stimulate progressive ideas; nevertheless teachers are potentially the greatest factor for innovation, and change has often come from the minority group in their ranks.

If this potentiality is to be realized and if teachers are to be mobilized in support of curriculum change, both initial and in-service teacher education must convince them of their crucial role in promoting innovation. Hitherto opportunities for up-dating of teachers' knowledge and for the familiarizing them with pedagogical advances have been as haphazard as they have been restricted. In the view of the Workshop there is an urgent need in all Member countries for massive encouragement and extension of in-service education on a systematic basis. This provision should take a variety of forms, covering both on-the-job training and more general courses outside school.

To enable the former to be carried out, the school timetable should set aside a reasonable amount of time when members of staff could cooperate and exchange views on devising inter-disciplinary and integrated courses: team teaching in open planned accomodation could bring staff into fruitful contact: video tapes and closed circuit TV would create opportunities for self criticism. As a means of consolidating on-the-job training, teachers' centres should be established: they provide a place where teachers could find solutions cooperatively to practical problems which they have encountered in the classroom.

As for courses outside schools, provision should be made for them to be held not only in vacation and at week ends but also during school hours. These courses should be conducted, where possible, by practitioners and should be work-based. Active participation ensures interest and spells relevancy for a profession which is still suspicious of curriculum reformers. Residential courses have an added value: they ensure the confidence that comes from knowing the course members well, and provide time for the exchange of opinion outside formal sessions. It is also essential that there should be adequate follow-up arrangements to enable teachers to discuss with consultants the difficulties which they meet in applying what was learned on the course. Curriculum experiments which are not initiated by practising teachers should be based on pilot experiments and modified in the light of the teacher's experience in his own particular school with his own students.

Students

Events all over the world indicate the dissatisfaction of post-secondary students with the education they receive and with society as a whole. With their main goal, a greater share in making the decisions which affect them, most educationists would agree. It is the methods of the small minority which are unacceptable because they resort to violence and interfere with the freedom of their contemporaries to pursue other goals. The greatest challenge to educators is not that large majority of students who, if they shum confrontation with the minority, also eschew violence: rather is it the ambivalent attitude of the many towards those few who are loud in slogans but quiet in argument.

The schools cannot avoid some share of blame for the problems of unrest in institutions of higher education. Indeed these problems are now beginning to appear in schools themselves and are likely to increase as the school leaving age is raised. Plans for the provision of greater opportunities for pupils to influence the curriculum should be made, not because militant students demand more participation, but because it is desirable and welcome on educational grounds. There seems no good reason why they should not be involved in decision making about content

and methods of teaching. The energy and the enthusiasm of youth for taking on such responsibility are healthy developments to be channeled in constructive ways. This applied particularly to the age groups 16-19, but it has a relevance to younger pupils, especially those who will leave school as soon as they are allowed to do so and who should not be denied opportunities of leadership because of the presence of older pupils.

All pupils should be able to exercise some choice of subjects and of courses, though a certain spread might be compulsory in order to ensure general education, including particularly knowledge of the social and economic system and some discussion of the purposes of education. Many of them will also need to have consultations with those teachers who, because they are especially sensitive to the developing personal and social needs of adolescents, can offer constructive guidance in curricular and vocational matters.

The voice of the pupils concerning school organisation and discipline should also be heard in a school council or some similar body. Since students, however, are not mature adults, limits should be put on its freedom of action: whether these limits would be wider or narrower than those binding on other citizens is perhaps a matter on which opinions would differ, but it is important that the minority should not be allowed to over-ride the wishes of the majority and the freedom of the individual should be protected.

II

THE IMPLICATIONS OF CHANGES IN SUBJECT FIELDS

Introduction

This chapter deals with changes in subject matter rather than teaching methodology or the overall organisation of the school. As is indicated in Chapters III and IV, the social structure of the school and the quality of the relationships between teachers and learners have a more lasting effect than human personality. However, some important concepts and capabilities have to be deliberately acquired by building them into the curriculum rather than picked up incidentally on the way through school or life; and it is with such concepts and capabilities that the present chapter is predominantly concerned.

There is a natural temptation, in reviewing curriculum changes, to draw up a model curriculum specifies how many hours in each week should be devoted to this subject or that during a particular stage of schooling. While this approach has the merit of concentrating discussion on fairly specific issues, it has not been adopted here. In the 1980s it will not necessarily be the case that the major part of school work will be organised in standard time units of, say, 40 minutes or an hour. In fact, it seems likely that a much more flexible time-tabling system will be employed, allowing a larger proportion of unscheduled time and a greater variety in the length of scheduled lesson units. Nor will it necessarily be the case that schools operate for a relatively short period each day and for a relatively small number of weeks during the year, nor that each student is allocated precisely the same amount of time to carry out his formal studies. But even in those countries which have chosen to maintain the present system of time-tabling units, some national differences in emphasis are likely to remain, and no one pattern of time allocation is likely to suit all different systems. Even an attempt to specify relative degrees of emphasis on particular subjects at different ages (to say, for example, that mathematics and the learning of the native language should be given greatest emphasis in the early years of schooling) is not likely to be particularly illuminating.

The discussion which follows concentrates, therefore, on the broad principles of curriculum planning and design - insofar as these are likely to apply in the 1980s - rather than on specific curriculum proposals. It begins with an examination of current changes in what are today seen as the basic elements of curriculum, namely the traditional subject disciplines. Such changes seem to be common to a surprisingly large number of different educational systems, even though the discussion which follows must inevitably be both tentative and controversial.

Current trends in various subject areas

a) Mathematics

There is a basic question about the importance of mathematics in the curriculum. Since medieval times it has traditionally held a sacred place, and many educators argue that it will continue to play an essential role as we enter an era of increased technology. To some extent, schools seem to be influenced by the popular myth that knowledge of mathematics will lead to political and economic power in the future.

Despite the attractions of this myth, present trends suggest that mathematics will increasingly be seen, for the majority of students, as comprising a useful set of techniques to be applied in practical contexts, rather than as an abstract study in its own right. Accompanying this shift in emphasis from "pure" to "applied" mathematics, efforts will probably be made to strengthen the ties between the teaching of mathematics and other subject matter areas. Basic mathematics will tend to be introduced through simple ideas in set theory, linking up with the teaching of logic; statistics and probability are likely to be emphasised for their contributions to the biological and social sciences; and computer technology is likely to bring an increasing need for people with skills in numerical analysis and programming.

In recent years, there has been a growing interest in the development of self-instructional materials in mathematics. So far, these materials appear to have been more successful with self-motivated and gifted students than they are with those showing less initial ability in mathematics: but improved techniques of programming, together with the more imaginative use of audio-visual media, are likely to result in materials with a wider appeal.

b) Science

In recent years, biology has been assuming a position of increasing importance within the secondary school science curriculum. There is a tendency for the teaching of physics and chemistry to become more

closely allied and for their connection with other disciplines to be emphasized. For example, the notion of physics as presenting a model of the physical world leads into questions concerning the philosophy of science; and a study of self-regulating mechanisms links up with the new field of cybernetics. In chemistry the rapid developments in research into organic compounds, and the numerous industrial applications of these compounds, have not yet been reflected in school curricula, but this change is likely to come about within the next few years. There will probably also be a greater emphasis than at present on the chemical basis of biology.

School biology teaching is already beginning to reflect some of the recent developments in cytology, genetics and enzymology. With the study of animal behaviour assuming a position of increased importance, students are being introduced to techniques of field observation. There has been a corresponding reduction of emphasis in the teaching of anatomy, physiology, morphology and systematics. One result of the new biology teaching is to tie the study of biology more closely to the study of man. Human language, for example, can be viewed as part of the general structure of communication which includes the communication system of animals; and the sociology of man can be seen in part in an ecological context. Another trend is to relate biology more closely to practical concerns in the fields of hygiene, medicine, pharmacy and technological development in general.

In terms of teaching method, there has been an increased emphasis on experimentation and observation. This presents a major challenge in some of the new areas of study where experimentation is difficult: but serious attempts are being made to evolve simple ways of illustrating such themes as Brownian Motion and the production of DNA.

c) Native Language

In the teaching of the native language, much discussion turns on the basic issue of whether it should be seen as a means of communicating the national heritage (with a strong emphasis on literature), or whether language studies should focus on communication skills and an examination of the social function of language.

Already in literary studies, the popularity among students of modern literature (including literature in translation), and the increased influence of the cinema and contemporary drama has reduced the study of historical literature to a relatively minor role. The predominantly linguistic approach, which is now gaining greater currency, emphasizes the skills of understanding, speaking, reading and writing in two aspects: first, as a repertoire of useful tools based on convention; and second, as a

series of creative activities, embracing the critical analysis of styles and techniques of argument, the ability to discuss and debate, and the ability to depart from linguistic convention in order to convey new insights.

The importance of training in basic communication skills for culturally deprived children is increasingly recognized. There is also greater recognition of the need to divide classes into smaller groups and offer individualised work in order to accomodate different interests. A new feature of native language teaching is the conscious emphasis on the acquisition and handling of information, resulting in more systematic training in the use of libraries and other sources of reference.

d) Foreign Language

Latin teaching is rapidly losing its position of pre-eminence. In a few years, it will probably no longer be regarded as more than a specialized option. In its place, modern European languages are growing in popularity, with the emphasis placed on the teaching of language for practical use. A broader range of choice is likely to develop in the future among the languages available. However, in countries possessing a widely-spoken language of their own, pressures from other areas of the curriculum may well result in only one foreign language being generally studied in the schools, other languages being added later as necessary either in the final years of schooling or during later life as "crash courses".

With the initial emphasis on learning foreign languages for everyday use, considerable advantage is already being taken of recordings of authentic native speech. Tape recorders - which need not necessarily be linked in the form of language laboratories, whose cost-effectiveness is open to question, but may be made available to students working on an individual basis - have come to be regarded as an essential item of equipment. Against this background, the more advanced stage of language learning is likely to focus on languages for particular purposes studies (such as technical Russian for engineers) with literary studies forming one option among others, rather than being taught as a compulsory element.

e) Humanities and Social Studies

This is likely to be one of the areas of greatest curricular change in the next few years. Except with more able children history and geography are disappearing as separate subjects in the curriculum: in particular, history is in much countries no longer regarded as a vehicle for conveying the cultural traditions of the past, but as contributing to a wider study of human behaviour in all its aspects. Comparisons of different human cultures - in time as well as in space - are likely to

form elements in the study of such themes as man as a social animal, the evolution of human political systems, and the nature of human creativity as expressed in art and artifact.

Ethical and religious education, although at present separate elements of the curriculum in some countries, and omitted altogether in others, are likely to become more closely related to the study of social behaviour. Children may be encouraged to see that no society has been totally unsuccessful, or totally successful, in solving its ethical problems. The examination of basic human rights in relation to current social norms, together with a recognition of the need for social co-operation and individual responsibility, must be important components of the student's personal and social development. But rather than imposing values, there may be a greater emphasis in future on encouraging students to form their own conclusions, and to discuss these in relation to the controversial issues of contemporary society.

The introduction of new media is likely to play some part in curriculum reform in social studies. Film and videotape are coming to be recognized as useful tools for the recording and subsequent analysis of behaviour: games and other simulation devices can also help children to perceive and reflect upon the complexities of man's social interactions. In this field, above all, there is likely to be a particular emphasis on open-ended enquiry.

f) Physical Education and Expressive Arts

Most European countries are now facing a serious challenge to traditional programmes of physical education. While athletics were once quite popular, students are now seeking the abolition of formal exercises and competitive games. They wish to change the content of instruction to activities which emphasize individual self-expression (e.g. educational dance). As a result, a new emphasis is emerging on the provision of widely differing activities to suit individual interests and needs. There is also some pressure for a breakdown of the differences in the physical education received by boys and girls.

Although the socialising influences of team games (keeping rules, co-operating with others, leading a team) may have been exaggerated in the past, physical education in its widest aspect is likely to remain an essential means of developing and expressing the non-verbal aspects of personality. It may also be crucial in maintaining health in a sedentary society.

Similar changes have taken place in the expressive arts. There has once more been a reaction against the formal teaching of techniques,

and a greater emphasis on learning through self-expression. The available range of expressive activities has increased, as has the scope for individual choice within this range. New links are being forged between activities which were once rigidly separated: dance, music and drama are more closely allied with one another, as are painting, sculpture, pottery and crafts. But there remains a serious under-emphasis on these fields in a curriculum increasingly dominated by academic studies; this imbalance can be corrected only as indicated in the previous chapter, by modification of university selection procedures.

New demands on the curriculum

This brief survey of current trends in the traditional subject disciplines can offer no more than a few uncertain clues to the likely structure of the curriculum in the 1980s and onwards. Such trends must now be set against the wider perspective of the changing goals of education analysed in Chapter I. Against this background, certain main principles emerge which are likely to have a far-reaching effect on curriculum design.

1. The school will be regarded more as an agent of change than as a transmitter of traditional culture. This means that its main focus will no longer be on the past, and that it will become more sensitive to changes in contemporary society.

2. The current demand, common to all economically advanced nations, for continuing mass education beyond the present minimum school-leaving age will accelerate the tendency to provide comprehensive programmes suitable for a wide range of academic abilities.

3. Partly as a result of this, and partly because of the need for career adaptability, the secondary school curriculum will be a broad one, keeping several options open.

4. There will be a trend towards greater uniformity between different national systems in OECD Member countries, particularly as regards qualification standards. This will be accelerated by better inter-communication and more systematic action research brought about by agencies such as CERI, and also by closer economic interdependence and higher mobility of labour.

5. There will be an increasing dissatisfaction with current examination techniques, and a consequent tendency to favour continuous assessment systems and qualifications based on course credit units.

6. Some changes now noticeable at the primary stage are likely to be carried over to the secondary level, especially greater variation in student groupings, more flexible time schedules and more work based on independent study and on team projects.

7. Some subject fields which are usually at present omitted from the secondary curriculum, either because they are regarded as extra-curricular (e.g. social education) or as more appropriate for the tertiary stage (e.g. psychology or engineering) will become incorporated in the normal secondary school provision.

8. Communication skills, including non-verbal expression, will be seen as a common element in all aspects of the curriculum; and creative, expressive, effective development will be accorded as much importance as analytic training.

9. The present shift from teaching for information to teaching for experience will continue; in consequence, problem-solving and problem-finding activities, both for individuals and groups, will assume a more central role.

Specialization, integration and individuality

Education has always been faced with the dilemna of having to meet three sets of essentially differing demands: to satisfy the needs of the individual, to accomodate to the needs of society, and to meet the requirements of the economy for trained manpower. In different countries and at different times, the emphasis has fallen more heavily on one of these than on the others, but none can be altogether ignored. The coming years are likely to pose the dilemna in a particularly acute form.

With the vast explosion of knowledge, there is an inevitable demand for more and more specialized skills, with a corresponding fragmentation of the curriculum into narrower and more numerous subject disciplines. But at the same time, the increasing complexity of the problems with which advanced societies are faced seems to demand a much greater area of common understanding and concern. And there has been, among students, a powerful reaction against seeing education as an instrument for developing the products which the economy needs, accompanied by a fundamental questioning of the values implicit in contemporary society. It seems that we are witnessing a return to the notion of education as predominantly a means of nurturing individual talents, and of providing a way of fulfilling the individual's needs for self-expression.

There seems to be only one possible way of resolving this acute tension between the needs of specialization, of common understanding, and of individual development. It lies in designing a basic core curriculum for all students, which is capable of establishing a common lingua

franca of ideas and experience, and supplementing this with a range of options which are as wide as the school and its surrounding community can provide. These options must help the individual to develop his own special interests and abilities, whether they happen to lie in the intellectual or practical sphere, or both. They must help equip him to earn his living, and to spend his leisure profitably, just as the core curriculum must enable him to play a full part in the human society to which he belongs.

Clearly, the relative proportions of time available for core curriculum work and for individual options will vary from one educational stage to another, with the optional elements tending to increase as the student proceeds through the elementary school into the middle school and then towards the upper secondary level. Even in the final stages of schooling, however, it is desirable that a substantial proportion - say up to half - of the time available should be devoted to core studies.

Particularly in the higher age ranges, many of the students' optional activities are likely to take place outside the school itself, making full use of community facilities. For example, those wishing to gain practical experience of computer programming might be given part-time employment in a local government office, while those interested in social work could help in a welfare service agency. Because the availability of such options will depend greatly on the nature of the local resources, no uniform pattern can be laid down for them. On the other hand, because the core curriculum must be specifically designed to meet the common educational needs of all students, there is likely to be a considerable degree of uniformity of provision for this, not only between one locality and another within each country, but also between one country and another. The nature of this core curriculum must now be considered in greater detail.

The core curriculum: a simple model

Given the requirement for greater integration between different disciplines, the avoidance of fragmentation, and the breaking down of conventional barriers between subjects, a deliberate attempt must be made to develop a broad pattern of studies for the core curriculum. The conventional subject disciplines can, of course, be linked together in a number of different ways, and no one pattern of grouping is likely to offer a perfect solution. However, as a first approximation the following model suggests itself as a suitable basis for more detailed development.

The curriculum can be viewed as comprising three overlapping areas of subject-based activity, each taken to cover both theoretical enquiry and practical application:

i) the sciences, including mathematics, biology, the physical sciences, and technology;

ii) the social sciences, including practical experience of taking different social roles as well as the study of aspects of economics, psychology, sociology and social anthropology;

iii) the study and practice of communication and the expressive arts.

There are a number of fairly obvious cross-linkings between these areas: for example, mathematics will link up with linguistics in the investigation of the properties of formal communication systems; biology with sociology in any study of human behaviour; social anthropology with creative arts in any comparisons of different culture systems; three-dimensional art with technical design in the development of new artefacts; and so on.

This simple model, however, is inadequate as it stands. Clearly, a considerable degree of selection has to be exercised within each of the three areas. The total range of possible activity in any one area is far too vast to be encompassed in the course of a school career, and at best the core curriculum can cover satisfactorily only a small proportion of the whole. The aim must be to choose a limited number of aspects within each area, but to make the choice in such a way as to offer an insight into the characteristic techniques of argument and methods of procedure in that area, as well as to provide meaningful connections between theory and practice.

Towards a more detailed model

The difficulties of selecting a core curriculum to meet these requirements are very great. However, a beginning can be made which will help to refine the model of three overlapping areas, to clarify the relationships which exist within and between them, and to guide the final choice of curriculum content in each. The way ahead lies in a careful analysis, within the groups of related activities in each main area, of the essential skills to be acquired, the categories of knowledge to be attained, and the attitudes to be fostered.

To illustrate this process, a sample analysis of the field of social and ethical development is set out in table 1, identifying requisite skills, knowledge and attitudes, together with the requirements necessary to promote them within the school. When similar analyses are attempted for other fields, it soon becomes clear that the three broad groups of activities earlier identified have characteristically different profiles, but that the different activities within each group share a number of

Table 1. SOCIAL AND ETHICAL DEVELOPMENT

SKILLS	KNOWLEDGE	ATTITUDES
1. Reciprocity in social behaviour 2. Co-operation 3. Leadership	A broad 'cognitive map' of social reality as a frame of acting, thinking and feeling - social norms and sanctions - basic ethical concepts as tools for problem-solving and decision-making - main types of ethical thinking (theories) - values, value-systems, ideologies	1. Empathy 2. Preserving human life, not destroying it 3. Respect for human rights of others 4. Commitment to the personal value system 5. Openness to different value systems
Learning in real social situations - group work and learning by social communication in groups	Learning based on: - observing and participating in the community - films on social behaviour - simulation, role-playing, dramatization, etc. - verbal communication (oral and written)	- Teachers who themselves express these attitudes - Respecting these values (2, 3, 5) in the school life - Using these values as criteria when evaluating social reality from ethical standpoint - Expressing these values (and not the opposite values) in text-books, etc.

common elements. However, drawing a complete map of the three curriculum areas, even at the relatively superficial level shown in the illustrative example, remains a major task for curriculum planners in the coming decade.

Applying the results

Once this type of analysis has been completed, it should be possible to identify some essential skills to be developed, together with some widely applicable methods and techniques, and some concepts which are fundamental to the understanding of a given subject area. A clearer picture will also emerge of the attitudes which are likely to be fostered by suitably chosen learning activities in each area. We now need to see how these results can be used in planning the core curriculum.

Taking the attitudes first, some of them may prove particularly important in relation to the general educational goals of the school, and will therefore exercise a strong influence on the final choice of curriculum content: others which are seen to be less essential will indicate possible omissions from the core curriculum. (However - as was remarked at the beginning of this chapter - many of the educationally most important attitudes cannot be derived in any direct manner from the formal curriculum, and provision for these must be made instead in the way that the school itself is organised and in the choice of method by which learning takes place).

Turning next to skills, some will of course be common to more than one area, and it is likely to be more economical to teach certain of these basic skills directly. Such teaching will usually be initiated at the primary school, but will continue at an increased level of sophistication well into the secondary stage. The following main categories of skills may be put forward as possible illustrations:

a) Social skills - behaving and reacting (guidance on socially acceptable behaviour, competence in personal relationships, etc.);

b) Intellectual skills - thinking and inventing (encouragement of rationality in argument, creativity in thought);

c) Numerical skills - enumerating and calculating (development of the ability to think quantitatively);

d) Linguistic skills - communicating and receiving communication (oral fluency and basic literacy in one's own and at least one other world language);

e) Practical skills - performing and exercising (manual dexterity, psycho-motor co-ordination, etc.).

All such basic skills will be brought into play, in some measure (though the emphasis will obviously vary from area to area) in each of the three main groups of core activities. But in addition, students should be enabled to acquire more complex capabilities through their experience of applying the methods and techniques characteristic of each main area. For example, in the sciences they will learn to observe accurately, to formulate and test hypotheses, and to reason deductively and inductively; in the area of the social sciences they will learn to think analogically; in the area of communication and the expressive arts they will learn to analyse and appraise their experiences as well as to express and convey their sensations and feelings.

Finally, among the fundamental concepts which are identified by the process of analysis, some will be common to neighbouring disciplines within one area. Such concepts might form the basis of integrated themes of study within that area (for example, a unit linking aspects of physics, chemistry and biology might be built round the concept of energy). Other concepts will be seen to straddle the boundaries between different areas, so opening up opportunities for interdisciplinary enquiry (as noted earlier, human behaviour is a concept common to the biological and social sciences, and can be used to link the two).

Making connections

These conceptual connections are among the most important in any attempt to move towards a more unified curriculum. However, bringing out into the open the common intellectual elements between different disciplines is only one of the strategies which can usefully be adopted. There are two other ways of forging links between different aspects of the student's work so that he is helped to see its relevance more clearly.

First, links can be made between theory and practice through carefully chosen projects. For example, a group of students may become involved in constructing a simple computer. This will necessitate not only an understanding of the mathematical requirements which the computer must meet, but also a familiarity with the principles of electronic circuit design, together with practical competence in assembling the component parts. Some projects may fall largely or entirely within one area of subject-based activities (as the example given comes within the area of the sciences); but others will demand competence in more than one area. The essential requirement is that each project chosen should embody some genuine practical problem which the students can become motivated to solve, rather than merely demanding some routine series of drills leading to a product which has no clear significance or usefulness.

Secondly, themes of enquiry may be selected which demand the application of a variety of problem-solving techniques. For example, any attempt to tackle the issue of water pollution in a particular river will demand not only some investigation of the chemical sources of the pollution, and of the possible alternative methods of disposing of industrial waste materials, but also a consideration of the extent of the ecological effects of this pollution, and of the social implications of adopting various possible courses of action (leaving things as they are; dumping in the sea an alternative production process which eliminates harmful waste and so on). Many of the most pressing contemporary issues are of this complex kind, where the solutions cannot be found in terms of a single subject discipline, or even of a group of related disciplines. But again, as in the case of practical projects, the topics must be intrinsically valid and worthwhile and not artificially contrived. There is unlikely to be any scarcity in the 1980s and onwards of suitable problems for such interdisciplinary study; and students preparing themselves to become responsible members of society are likely to recognize their importance.

Practical steps towards integration

Any attempt to move from the present fragmented curriculum to a more integrated common core is beset with difficulties, both intellectual and practical. But if this is indeed the direction in which secondary education should now be moving, it is possible to identify certain immediate measures which can be taken to prepare the way for long-term change.

The need to map out the three main curriculum areas in detail, and to identify those fundamental concepts which can serve as common elements between different disciplines, has already been emphasized. A number of examples of such intellectual integration already exist, especially at the frontiers of university research. In the sciences there is at present under way an extensive re-examination of traditional disciplinary categories: for example the concepts of cybernetics are beginning to exercise a powerful influence on the study of the behaviour of both inanimate and animate systems. Interdisciplinary investifation of this kind is less well established in the social sciences, although there is reason to expect that some significant advances may be made in the next decade. But such trends in advanced research normally take a very long time to influence the work in schools. If the time lag is to be reduced, there must be more deliberate and systematic attempts to bring teachers into contact with leading scholars and researchers, so that they can together devise school curriculum units based on unifying themes.

At the same time, work can go ahead in planning activities based on projects and problem-centred enquiry of the types described above. Such work could be strongly supported by the development of appropriate curriculum materials. Many of these materials, because they are of a new and unfamiliar kind, may need at first to be developed co-operatively at the national - or even the international - level; but once a satisfactory style had been evolved, it will be increasingly important to stimulate regional and local development programmes, including some work at the level of the individual school. Such locally-based work is likely to bring a double benefit. First, it can supplement the materials produced nationally or internationally with elements which have a more direct significance for students in a particular region of the country; second, it can give the teachers themselves a closer familiarity with the problems and possibilities of interdisciplinary planning.

In the long term, greater integration can be achieved only if teachers from different disciplines learn to work together and plan together in this way. Within each school, therefore, teachers must be encouraged to meet the creative challenge of developing interdisciplinary curriculum approaches of their own as well as of using effectively materials developed elsewhere. Such co-operative work will need to be backed up by extensive pre-service and in-service training schemes. The case for training of this kind has already been made in Chapter I; given the trend in recent years for teachers to become narrower in their specialization, the arguments become even more cogent. Organisational structures, teaching facilities and school buildings can all be redesigned to create an environment favourable to integration; but no really fundamental and lasting change can come about unless the teachers themselves are persuaded of the need, and professionally equipped to meet it.

A new perspective on the curriculum

The suggestions put forward in the course of the present chapter, when taken together, suggest a new way of looking at the secondary school curriculum in the years ahead. First, a distinction is drawn between a core element common to all, and a series of individual options. Some of these options will enable the academically-minded to study a specialized subject in depth; others will give scope for creative activities; others will be related to vocational or leisure interests.

The common core curriculum can be seen as comprising three elements: basic skills, groups of subject-based activities, and problem-centred projects and enquiries. The teaching approach to each group of subject-based activities will be concerned less with the acquisition of short-term factual knowledge than with the development of long-term conceptual understanding. The emphasis will be on the structure, not

the content, of the various constituent disciplines. Or to put this another way, and to reaffirm what has been said in Chapter I about the need to develop active attitudes to inquiry instead of passive acquisition of knowledge, there will be greater concern with the techniques of solving new problems than with the already known solution of familiar problems. The relevant instructional materials are likely to comprise a series of relatively short and self-contained course units or modules, many of which are designed for individualised learning.

Just as each student will be encouraged through secondary school to continue the development of the basic skills first learnt at the primary school, and to apply these in each of the main groups of subject-based activities, so too will he or she be enabled to apply the problem-solving techniques acquired by means of these activities to practical projects and enquiries. Some will be of a technological kind, involving constructs; others will be of a human kind, involving relationships; but there will also be those - which form the largest and most important category - involving both. They will between them cover a large variety of relevant contemporary themes: urban planning, population control, sea farming are a few examples which now suggest themselves, but the main areas of concern in the 1980s cannot yet be easily foreseen. Tackling these problem areas will (in contrast with the largely individualised study of groups of subject disciplines) usually demand co-operative team work, involving the mixed strategies characteristic of operational research and systems analysis.

The proposals as a whole may be conveniently summarized by contrasting three different curricular patterns. The first relates to traditional subject teaching. Here, the initial focus is on the disciplines themselves: the development of basic skills and the ability to tackle new problems are both seen as incidental by-products of specialised teaching in a series of rigidly separated compartments. It may be noted that, in consequence, any problems studied are normally limited to those associated with a single discipline (mathematical problems are purely mathematical, and so on; there is none of the complexity characteristic of the issues of everyday life).

The second pattern, which has developed as a reaction against the deficiencies of traditional subject teaching, may be described as topic-based. This starts by selecting a series of topics, often of considerable generality (e.g. "Power") and develops from these a variety of follow-up studies intended to promote both a mastery of basic skills and an understanding of subject disciplines. But often the theme is one that leads to little useful interconnection between the follow-up studies (electrical power, for example, has no more than a random connection with political power); and such a curriculum tends to leave the development of skills and techniques largely to chance.

The third pattern is the one put forward in this chapter, in which the development of the core curriculum is from basic skills to a useful repertoire of problem-solving techniques associated with related groups of subject disciplines, and thence to a pursuit of projects and problems chosen for their relevance to current social issues. The fashion for topic-based studies as such is likely, it is suggested, to give way to a requirement for a more structured and systematic coverage of key elements in the curriculum, differentiating both in terms of content and approach between basic skills, subject disciplines and problem-centred projects and enquiries.

III

THE IMPLICATIONS OF NEW TEACHING/LEARNING METHODS AND THE SYSTEMATIC APPROACH TO CHANGE

Introduction

Changes in the content of the curriculum along the lines suggested in Chapter II will inevitably have far-reaching effects on the nature of the teaching/learning process. Not only are the school's curricular activities likely to become much wider in their scope, but they will also be accompanied by a much greater variation in the groupings of pupils and teachers, and in the allocation of time and space. The secondary school curriculum traditional to most Member countries - with standardized lesson periods divided up between a large number of distinct "subjects", each taught by a specialist teacher to an approximately standardized number of pupils, in a standardized "classroom" unit of accomodation - is, for all its rigidities, fairly simple to organise. But once the rigidities begin to disappear, the management of learning - ensuring that the right resources are available to the right student at the right time in the right place - becomes increasingly complex. Systematic planning is therefore a necessary condition for bringing about any effective curricular change.

The present chapter begins by outlining briefly some of the requirements of a systematic approach to the organisation of learning in the much more flexible curriculum of the eighties and onwards. In particular, because teachers are likely to engage far less in formal class teaching, students must have a greater wealth of learning materials on which they can work independently, so enabling the teacher to spend a larger portion of this time on individual tuition. The development of these learning materials, making use of new media and new techniques, itself presupposes systematic design processes. The subject is considered in

some detail in the OECD Workshop Report Educational Technology*, to which further reference is made below. The main emphasis of the current discussion is, however, on those aspects which relate directly to curricular organisation in the secondary school.

The clarification of objectives

An essential starting point for systematic thinking is a reconsideration and re-analysis of the objectives of any given curricular activity. It was suggested in Chapter II that learning requirements should be carefully spelled out in terms of the attitudes, knowledge and skills which each element of the curriculum is specifically intended to foster. The sample analysis given of moral education (page 25) immediately suggested certain types of activity which seemed likely to be especially relevant in achieving the desired goals. Quite apart from helping to identify curriculum content, the clarification of objectives is an important step in helping to define the teaching processes to be adopted, the types of learning materials to be used, the media through which these materials can best be presented and the ways in which the social environment of learning should be organised.

In the course of such an analysis of objectives, it becomes clear that change in curriculum is as much concerned with methods of learning and with internal school organisation as with content. Indeed, in the case of those highly important, rather complex objectives concerning an individual's personality and attitudes, methods and organisation can be seen to be rather more important than subject matter. To illustrate this point, we may briefly outline two such groups of objectives and consider how these might be reflected in teaching method.

i) The ability of the individual to learn for himself; to organise his own time and work; to concentrate of his own volition; to exercise initiative when faced with a problem, etc.

ii) The ability of the individual to co-operate with others in achieving a group aim; to listen and communicate; to be reliable; to repress his desires for the group good, etc.

The present teacher-class learning situation gives little scope for either of these sets of objectives to be achieved. It is for this reason that two major changes in method which have been mentioned earlier (and which have already been adopted on a small scale in a number of schools) are likely to be widely introduced. The first is in terms of

* Educational Technology: the Design and Implementation of Learning Systems, OECD, Paris, 1970.

"individualized" learning, supported both by carefully programmed and highly-structured materials, and by more open-ended "packages" in which considerable freedom is given to the student in the route he chooses to take. This implies, in terms of organisation, that the student should be provided with time spans in which he can work by himself and in which he must decide what he is to do. The second change lies in the introduction of small group learning, involving co-operative study between anything from two to, say, half a dozen pupils. The objectives of co-operation and communication cannot adequately be achieved by a discussion lesson once a week. The constant practice necessary would demand small group learning in various subjects. It has already become a part of the practical work in new science curricula, and is now gaining currency in other subject areas. A greater emphasis on project-based activity and on work in the creative subjects should allow much wider scope for its development.

These and other new methods, and their relationships to overall curricular objectives, are only part of the complex pattern which will be demanded if the schools are to respond to the pressures - both external and internal - for change. Other objectives again - and particularly those relating to social behaviour - may best be met in terms of the institution's overall pattern of organisation: Chapter IV deals with this point in greater detail. The framework within which a systematic approach to teaching and learning must operate is thus a wide one, embracing not only the characteristics of the teacher and the learner, but also the materials and media which reflect method and content, and the physical and organisational environment in which learning takes place.

The management of learning activities

The choice of a particular method on a particular occasion will depend mainly on educational considerations, but those whose task it is to manage the learning activities of a group of students must also have the practical facilities they need to put their methodological intentions into practical effect. Three broad groups of needs arise: the provision of physical facilities in terms of learning spaces (from individual study carrels on the one hand to large-group lecture halls with projection facilities on the other); the provision of learning activities of various kinds, often made available through materials, whether in "packaged" form (e.g. the Swedish IMU Mathematics programmes and the American Social Studies materials "Man: a course of study") or not (e.g. clay, easels, paint, paper for creative art); and the provision of media through which the student can have access to, and interact with, some of these learning materials.

In order to begin to determine priorities for meeting these practical needs, some kind of initial analysis has to be made. In terms of media, for example, it is obviously not adequate simply to decide to instal some expensive piece of equipment (such as a language laboratory or a closed-circuit television system) on the grounds that other schools have already done so. There must at least be an initial attempt to ensure that sufficiently intensive use will be made of it, and that it is likely to justify its costs in relation to alternative possibilities (such as a "bank" of simple tape recorders or a set of 8mm. loop projectors) in the light of its educational effectiveness.

A suggested basis for analysis

In the present state of knowledge (see Educational Technology: the Design and Implementation of Learning Systems, Chapter III) no really adequate methods exist of assessing cost-effectiveness in education. While comparative financial outlays on staff, equipment, materials and so on can, of course, be calculated, present evaluation techniques offer little possibility of putting a quantitative value on the qualitative result of any learning process. Nevertheless, in the absence of sophisticated tools of measurement, the answer lies not in the abandonment of any systematic planning but in a readiness to use more simple techniques as intelligently as possible, with a constant concern to refine and improve them.

It is in this spirit that we now offer in Table 2, as a starting point for further work, one suggested form of classifying and analysing teaching/learning methods. Three dimensions of classification have been chosen. Under "social setting" are listed various types of interaction between learners and teachers; "learning processes and situations" refer to the techniques by which the individual learns; while "media" broadly cover the various means of conveying information to the learner. The categorization is not necessarily complete, but it does cover those items which are of major interest at present to teachers and curriculum planners.

Table 2. CLASSIFICATION OF TEACHING/LEARNING METHODS

Dimension I: social setting		
1.	working individually:	a) free b) teacher directed c) programmed
2.	working in pairs:	a) teacher/student b) student/student

Table 2 (Cont'd). CLASSIFICATION OF TEACHING/LEARNING METHODS

Dimension I: social setting

3.	working in groups smaller than the class:	a) groups on the same work b) groups on different work
4.	working in class:	a) teacher - class (primarily one-way) b) teacher - class dialogue (two-way) c) discussion (several ways)
5.	working in groups larger than the class:	a) lecture, film, etc. b) team-teaching

Note: this classification leaves the matter of homogenous or mixed-ability groups to be decided.

Dimension II: learning processes and situations

1.	free play	
2.	discovery and enquiry	
3.	creative and imaginative work:	a) aesthetic b) technological
4.	learning of facts, skills and attitudes by:	a) trial and errors b) identification and imitation c) rote
5.	problem solving and structured discussion	

Note: this classification leavec the question of motivation, competition and rewards to be considered.

Dimension III: media*

1. human resources (teachers, peers, assistants, visitors, etc.)
2. print in all forms (books, sheets, graphs, reproduced material)
3. static visual material (blackboard, overhead projector, slides, photographs)

* This media classification scheme is taken from Educational Technology (OECD, 1970).

Table 2 (Cont'd). CLASSIFICATION OF TEACHING/LEARNING METHODS

Dimension III: media

4. sound media (tapes, discs, radio)
5. moving visual and audio-visual material (film, TV, CCTV, videotapes)
6. situational information (drama, role-playing, educational games, case studies)
7. apparatus and tools (as in workshops, laboratories; including models and simulators)
8. computers.

Applying the analysis

This classification system can, of course, bu used to display in compact form information about which methods are in general more suitable for certain areas of the curriculum, and which are likely to be more appropriate to one age group than another. A very tentative example of the former type of analysis is set out in Figure 1, suggesting the relative importance (on a four-point scale) of each method in the teaching of four conventional curriculum subjects (social studies, combined science, mathematics and foreign languages) to the age group 12-14. Clearly, the ratings would be different for other age groups.* It must be re-emphasized that the nature of the entries for each curricular activity must be closely related to the main educational objectives associated with that activity.

Information of this kind, systematically assembled, gives useful guidance in deciding on the priorities for resource provision. The example given in Figure 1 makes it evident how very greatly the pattern of demand varies from subject to subject. In relation to the age group in question, the following general points clearly emerge:

i) the relative importance of the three dimensions changes according to the subject concerned. For example, the "social setting" dimension seems to be of particular importance in science and social studies, whereas foreign languages depend more on media.

* The limitations of this exercise must be made plain. It was carried out by a dozen Workshop participants, including teachers of various disciplines, educationists and psychologists. The entries do not represent statistical averages, but group consensus after discussion.

FIGURE 1
AN EXAMPLE OF AN APPROACH TO THE ANALYSIS OF TEACHING/LEARNING METHODS AND MEDIA IN DIFFERENT SUBJECT AREAS

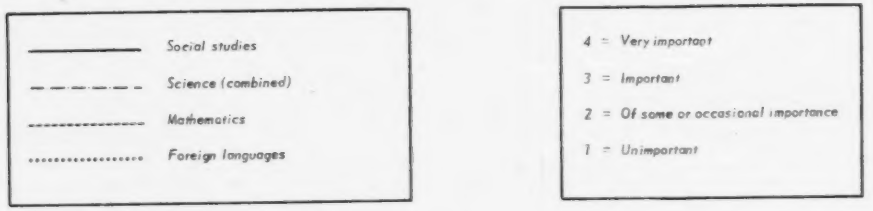


Figure 1 (A)

1. Working individually
   a. free
   b. teacher-directed
   c. programmed
2. Working in pairs
   a. teacher-student
   b. student-student
3. Working in small groups
4. Working in class
   a. teacher - class (one way)
   b. teacher - class (two way)
   c. discussion (several ways)
5. Working in larger groups
   a. lecture
   b. team-teaching

1 2 3 4

(Increasing order of importance)

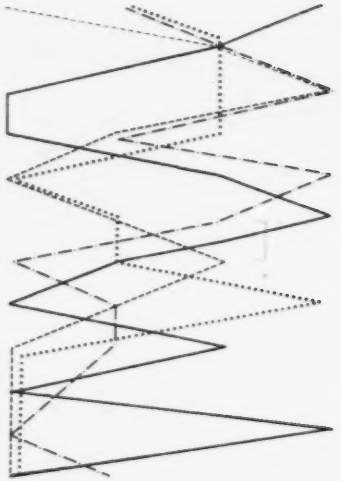
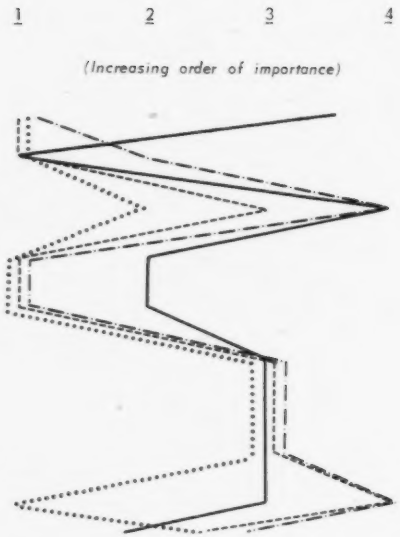
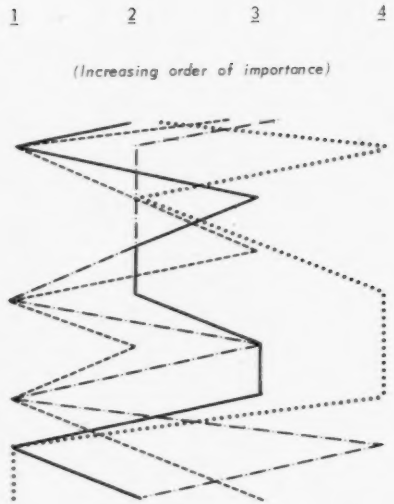


Figure 1 (B)



1. Free play .....
2. Discovery and enquiry .....
3. Creative, imaginative work
   - a. aesthetic .....
   - b. technological .....
4. Learning of facts, skills and attitudes
   - a. trial and error .....
   - b. identification and imitation .....
   - c. rote .....
5. Problem-solving and structured discussion .....

Figure 1 (C)



1. Human resources .....
2. Print in all forms .....
3. Static visual material .....
4. Sound media .....
5. Moving visual and audio-visual material .....
6. Situational information .....
7. Apparatus and tools .....
8. Computers .....

ii) Contrary to what might have been expected, team teaching does not seem to rank very highly in the given age group. This underlines the need for a differential approach to analysing requirements, not only between subject areas but also between age levels.

iii) Media are not ranked as being of such overriding importance as they are sometimes claimed to be. They appear, however, to be an indispensab' : element, supporting and facilitating all kinds of teaching/learning activities in conjunction with other methods. Technical means do not replace human resources as such. The need is underlined for a careful consideration of which media to use for which purpose, and in which situation.

Much further work clearly remains to be done on this, as on other relevant management techniques. In particular, the suggested ratings need to be elaborated and reviewed in more detail against an analysis of agreed objectives in each curriculum area. Different age ranges need to be considered, since the pattern for the 12-14 age group is not necessarily typical of others. The technique should be applied to other aspects of the curriculum and to involve assessments of relative importance by a greater number of specialists. Finally, the interrelationship of the three different dimensions needs to be brought out more clearly, since the linear form of presentation adopted in Figure 1 fails to do so adequately. This may call for punch-card techniques, or some form of three-dimensional display.

Some tentative conclusions

For those concerned with the management of learning activities, this sample analysis (with all its admitted limitations) indicates the relatively greater emphasis on learner-based than on teacher-based methods, implying that classroom space may cease to be the predominant form of provision. There should be some auditorium facilities for large group listening and viewing, and some open plan space for large group activities led by teacher teams. But the largest demand is for more individual and small group work stations, implying a considerable expansion in library-type space, with ready access to books and other learning materials. Again, these materials will tend in a number of curriculum areas to be based on discovery and enquiry methods, which means that they will have to go beyond the simple programmed text to embody practical investigations of various kinds as well as a wealth of reference sources, including a certain amount of audio-visual material. Because of limitations of cost, the media used to present this material will tend to be simple and cheap rather than complex and expensive: to justify, for example, introducing computer facilities into the school (as

opposed to having external access to them) would demand a far heavier pattern of use than is suggested in Figure 1. The management and organisational implications of all these trends are discussed more fully in Chapter IV, together with the changes they will demand in the role of the teacher and the internal management of the school.

One general point, however, emerges very clearly. While the ratio of teachers to learners will not necessarily change significantly from the present level (because in any school budget staff is always the most expensive item, and many of the funds available will be needed to convert accomodation as well as to supply 'packaged' materials and associated media), the teacher remains critically important. The new methods discussed in this chapter imply that the learner will become more dependent on other resources: but he will still need ready access to teacher guidance in most learning situations, whatever the social setting, the learning process or the media involved may be. Although the teacher will no longer be simply a purveyor of information, his task will still be a demanding one - in many respects more demanding than before. He will be concerned not only with the analysis of learning objectives and the selection of methods media and content to relate these objectives to the individual learner's needs, but also with the evaluation of their effectiveness and the need to modify the approach in terms of this 'feedback' information. But above all, his concern must be with the management of the learning process, and of the complex resources now available to make it fully effective.

IV

IMPLICATIONS OF CURRICULUM CHANGE FOR THE SCHOOL AND THE COMMUNITY

It will be apparent that the developments we have in mind, embracing 'the total process by which educational objectives are achieved', imply far reaching changes both in the working and social life of the school itself and in its relationship with the outside world. It is the purpose of the present chapter to explore these important implications in more detail.

The organisation and structure of schools vary from country to country, from those in highly centralized to those in decentralized systems. But despite manifest differences the actual practice within the schools is strangely uniform everywhere. Apart from a small number of progressive institutions, the general pattern is as follows: the school is divided into classes each taken by the same teacher for a particular subject: each subject is allocated a precise number of lessons according to a set pattern: every class occupies an enclosed 'box': lessons take the form of 'teacher exposition', aiming at an end level of attainment measured by some form of examination, generally externally imposed, which stresses the knowledge content of separate subjects. Everywhere the school has a fundamentally authoritarian structure of management. Invariably it is an institution enclosed and separated from society and from the local community.

All these characteristics are likely to be transformed by the 1980s. Why and how this transformation will occur must now be considered.

Changes resulting from political and social pressures

To meet the insistent demand for equality of educational opportunity, the comprehensive school will become the normal type, with the consequence that up to the end of compulsory schooling children of all abilities and attainments - and of widely varying motivations - will be educated

together. Even beyond the minimum age of leaving it is likely that between 50 and 80% of students will remain at school, si that there will be a student body of varying backgrounds and diverse needs at the upper secondary stage. A tendency to educate handicapped and educationally sibnormal children in the same schools as normal children may result in a still greater widening of the range of ability within the comprehensive school.

The trend over the next years is likely to be towards larger schools, on the grounds that they are able to make more effective use of specially qualified staff and expensive materials. But very large schools inevitably raise new problems, particularly in the care and control of progress of the individual student. It is perhaps worth pointing out that the development of more student-controlled, self-instructional materials, together with the increasing availability of distribution media such as television, would make it possible to reverse this trend - particularly by the use of correspondence course techniques (such as are available for the upper secondary school in Japan), combined perhaps with peripatetic teachers who have highly specialized qualifications.

Changes arising from new subject content, method and materials

Introduction of new content may involve new types of accomodation, new equipment and materials, different allocations of time, together with team rather than individual work by staff. The range of possible changes in subject content has been indicated in Chapter II. It includes some relatively straightforward extensions of existing practice such as the provision of more practical science accomodation and equipment (in which some Member countries are seriously deficient) and probably longer time-spans for lessons, in order to introduce a reasonable element of enquiry into the study of the sciences. But it also embraces more fundamental changes, such as the radical reorganisation needed to introduce social studies involving problem-based work of an interdisciplinary nature which may necessitate cooperation by groups of teachers and pupils, special materials and periods of work that might consist of a half or whole day - or even a week-long project.

Introduction of new method may also require considerable organisational changes. As has already been pointed out in Chapter III, many educational objectives are achieved through method rather than content. It is important that the management style of the school should not contradict the values and attitudes being put across in terms of teaching method. To take one obvious example, for the objective 'the understanding of democratic procedures', it is necessary to show such procedures in practice rather than merely to discuss them in theory: the management of the school must, therefore, exemplify democratic principles and involve the student in operating them.

New materials and equipment may be introduced as a result of new subjects and methods, or as a consequence of new technological possibilities. The school is likely to receive curriculum materials, centrally or regionally prepared, involving print in all forms (including programmed texts) as well as audio, visual and audio-visual material. Cheap and mobile tape recorders, slide viewers and loop film projectors will become fairly standard items of equipment. Closed circuit television within the school appears to be too demanding of teacher time and too inadequate in terms of the end product to warrant the expense involved: but television in the form of life broadcasts and video-tapes from national or local educational networks may well play an important part, as may films, in conveying certain dynamic processes, and in bringing the world into the school. Perhaps above all, to convey emotional states to students - what it is like to be on the receiving and of intolerance, for example - some form of moving visual image is a necessary medium, not merely a useful adjunct.

Changes arising from new concepts of the management of schools

These are of two kinds: those concerned with the management of the school by outside agencies and those concerned with internal management.

As to the former, in those countries where the curriculum is centrally controlled, there are already signs of a move towards some decentralization. This, taken in conjunction with the demand for greater freedom of student choice, may well offer the school more scope in determining part of its own curriculum, more flexibility in organisation and perhaps greater financial freedom. On the other hand, in those countries where the educational system is highly decentralized, the social demand for more equality of educational opportunity and the need for increasingly sophisticated curriculum material are likely to result in stronger central bodies, even though these may be advisory rather than mandatory. This trend is particularly noticeable in the United Kingdom.

In so far as the school develops into a community centre requiring a considerable measure of local rather than central control, there may be a further trend towards advisory or executive local agencies in which all interested parties are represented: local community, parents, staff of all kinds and students.

As to internal management, the recognition that it is both necessary and desirable to involve students in direct participation in democratic procedures is likely to result in forms of organisation which are less autocratic than those of the present day.

Changes arising from new concepts of the relationship between the school and the community

Two pressures will inevitably result in the school becoming a centre of community education and recreation. One arises from the increasing concern with lifelong education and with provision for increasing leisure; the other derives from the realization that the local community is in itself a source of material for many kinds for learning by students. In addition, there is also a growing realization that one way to mitigate the effects of a separate 'teen age' culture is to provide institutions where adolescents and young adults can meet.

*
* *

It is now proposed to discuss in more detail the significance of the changes adumbrated in previous chapters as well as those set out in the first half of this chapter. They can conveniently be set out under separate headings.

Teaching and non-teaching staff

The need for the modification of initial training and the extension of in-service training of teachers has already been underlined. It should, however, be appreciated that, in addition to teachers with the normal professional qualifications, there will be a demand for teachers particularly skilled in the use of audio-visual media and in the development and production of curriculum material; appropriate training will be necessary for these specialists.

The provision of community educational and recreational facilities within the school will probably result in a proportion of the normal teaching staff taking part in community work; this, too, will involve special training together with a salary structure adjusted to the new conditions. The community work will itself demand additional specialist staff who will need suitable training and may well require other than professional teaching skills. Some of these staff would in their turn be available to work part time within the school.

The whole school and community complex will require technical staff to service equipment and to prepare practical work for students; librarians and general assistants to organise curriculum materials; assistants for reprographic work; caretaking staff; and above all administrative and secretarial staff to undertake those aspects of the management of the institution which are inappropriate to teachers. The

long hours during which the complex will be open will necessitate a shift system of staffing.

The grouping of students and the recording of their progress

The present system of class instruction, where the level is geared to the needs of the average child in the class, is ill-adapted to comprehensive 'unstreamed' groups. The obvious alternative is in the development of individual and small group work. Such work may well be organised within larger units served by a number of teachers, e.g. 75 to 90 children with three members of staff. The flexibility which such an arrangement allows in individual rates of progress should eliminate the damaging system in some countries of keeping children back a year. It may also help to iron out the differences in a normal year group between pupils of varying degrees of maturity and between the youngest and the oldest in calendar age.

The most common method of assessing the progress of students is by written terminal examinations. As suggested in Chapter I such examinations can test only a limited range of achievement, placing particular emphasis on mastery of facts and ability to solve problems involving convergent thinking. Since the curriculum of the eighties will include a much wider range of objectives whose attainment cannot be easily tested by the traditional type of examination, continuous assessment will replace, or at least be considered equally with, a terminal examination. In any case, the need to keep track of individual students in a flexible system makes some form of continuous assessment and recording essential.

Given the emphasis on individual progress as well as the increasing size of schools, arrangements for the pastoral care of students will be essential. Each student's welfare must be safeguarded by one responsible person who has access to all available information on the student's current progress across the whole curriculum, who knows his home background, who can advise student and parent, and who can bring stimulus or pressure as needed. The requirement is perhaps not so much for a counsellor dealing with a large number of children of whom he knows only the problem cases, as for a 'housemaster' or 'yearmaster' of the type now common in large comprehensive schools in Britain: as a senior member of staff, he receives additional salary and a special allocation of time for his pastoral work.

Time-tabling for the school and for the school/community complex

From what has already been said, it is clear that the traditional school time-table will no longer be appropriate. A more flexible system

will emerge in which groups of related or integrated subjects are studied for longer spans, combined perhaps with shorter periods for practising certain skills - in foreign languages, for example. If the student is also to assume greater responsibility for planning and carrying out his own work, he will need a substantial amount of 'untimetabled' time - possibly two half days, perhaps more for senior students. It is also probably that the traditional scheduled breaks in the timetable will be replaced by arrangements enabling students to take reasonable pauses at natural resting points in their work: this change may with advantage be combined with cafeteria arrangements for meals, resulting in a more economic use of catering staff and facilities.

A school which also serves the local community will need to be open from early morning until late evening for six or even seven days a week and for some fifty weeks in the year; some part of the complex may need to be available for adults during school time. In the hours immediately following school, adults and students pursuing extra-curricular activities would both be present; later in the evening the majority of those present, though by no means all, would be adults. As has already been suggested, this will mean a shift system for staff together with special arrangements for supervision.

Organisation of curriculum material and equipment

The organisation of learning resources will become a matter of major concern when extensive packages of curriculum material are in constant use. It will be appreciated that such material will include books, pamphlets, folders, slides, tapes and records together with films and tele-recordings for occasional use. Material of this range and variety will demand well organised systems, run by responsible teachers (resource managers) and assisted by technical and other ancillary staff. Four main categories of material can be distinguished: that needed regularly by the individual student at his place of work and requiring special storage space and constant attention to avoid depletion through carelessness and natural wear; that which can be held centrally in the school but needing to be readily available (perhaps on a trolley) on demand at the student's place of work; that held centrally at a school resource centre accessible to students; and finally, the more expensive or more specialized material which is best held on a regional basis but which can readily be ordered and delivered to the school.

Clearly, special arrangements will have to be made for ordering, servicing and maintaining resource materials and associated equipment; it will also be essential to develop a reasonably detailed reference and retrieval system to enable staff and students to find material relevant to their needs.

Accomodation and furniture

The changes which have been described have major implications for school accomodation: implications which can and should be faced in all buildings being planned now. Because the exact nature of change and its pace are uncertain, buildings must be made as flexible as possible within the specialist needs that can be foreseen. Ideally, new buildings should consist of open-planned space subdivised not by expensive sound proof partitions but by eye level screens or storage furniture which can isolate groups of four or five students or can be arranged to allow seminar groups of fifteen to gather round a teacher. Such spaces will be carpeted and have sound absorbent ceilings, most of the cost of which can be met by a reduction in the number of internal walls and doors. Students are less likely to be distracted by a background hum of noise than by the sight of others moving about; hence the desirability of eye level screens which, incidentally, enable teaching staff to overlook the whole area. Light movable tables which can be grouped in any numbers may be preferable to expensive individual study carrels. Provision should also be made for a small number of lecture theatres capable of seating up to about 100 students; they need not have facilities for writing since their use will be for stimulus lessons or films rather than for formal teaching.

An increased emphasis on expressive and creative work in music, movement, arts and crafts will require suitable accomodation; if possible, this should be situated near the facilities for related activities such as design. Similarly the growing emphasis on technological studies will demand the juxtaposition of science areas with workshops. The development of integrated social studies, placing special emphasis on individual and small group work, requires the provision of suitable rooms close to the central resource area.

It is, of course, appreciated that not all schools in the 1980s will be housed in new buildings but it should not be too readily assumed that nothing can be done with old buildings to make them suitable for new needs. The judicious removal of walls together with careful planning of the additions which will be needed in most secondary schools over the next few years could achieve a great deal.

The development of the school into a school/community complex implies the provision of certain community facilities on the school site and of school accomodation which is also suitable for community use. A public library, swimming bath, sports hall and playing fields, a drama hall and even certain medical and social facilities may all form part of the complex. Within the main building there should be suitable provision for social meeting and refreshment (including possibly a bar in the evenings): such provision may also prove suitable for school meals

which are likely to comprise informal snacks and pre-cooked frozen foods rather than dishes cooked on the premises.

Internal management of the school

The management of a sizeable school/community complex of the type described will present considerable problems. The current practice of entrusting management to a headmaster, selected on the basis of his teaching ability, and who has had no training as a manager - or even taken a course to update his knowledge of developments in education - is no longer appropriate. One of the immediate concerns of any educational system ought to be the establishment of initial training and of regular retraining facilities for its own senior management; in this respect education lags far behind industry and commerce.

With increasing democratisation of the school's system of government, the headmaster may come to be seen as a chief executive carrying out on the one hand the policy laid down the community external to the school and, on the other hand, the policy decided by the staff (perhaps together with the students) within the school. While the headmaster would retain overall responsibility for running the school, there should be a system of appeal available if he makes decisions that do not conform with agreed policy.

Finance

The changes envisaged within the school of the 1980s imply increases in expenditure on certain aspects of education: in-service training and the training of senior management; increased quantity of, and associated equipment for, curriculum material; additional non-teaching staff. If the cost per student is to remain reasonably constant, this increased expenditure must be balanced by the employment of fewer teachers. For too long it has been assumed that a large front line army of teachers inadequately serviced by materials and non-teaching staff is more effective than fewer teachers with adequate support. Although the quality of education is not susceptible to accurate measurement, cost-effectiveness studies of the optimum mix of teachers and material resources would encourage teachers to analyse how they use their time and indicate to central planners the size of the teaching force required. In any case, since it is far from clear how educational finance should be distributed on services within the school, there is need for flexibility, or 'virement', between administrative headings for expenditure. At present, this is often impossible owing to legislation or administrative practice; changes in methods of financial control may, therefore, be an essential prerequisite for curriculum change.

V

THE PROBLEM OF EVALUATION

In the 1960s, curriculum developers proceeded bodly. The most typical procedure was one in which men and women with imagination and determination attempted to introduce new materials, new subject content and new methods of teaching into the schools. In the early days, the subjects selected for change were science and mathematics; latterly the movement has spread to arts and humanities. The developers were certain that much irrelevant and out-of-date material was being taught in the schools, and that they could replace this outmoded curriculum with something much better; something more relevant and more interesting. Very often, the ideas for the new content came from outside the classroomn from the universities and colleges, though naturally teachers were called upon to play a part in the introduction of the new materials.

The developers were not particularly interested in cool and careful evaluation, or in producing precise hypotheses to be tested by patient educational research. It can be argued that much of the strength of the curriculum development movement was due to the ignoring of some intractable problems (for example the problem of the inadequate teacher, bad social conditions, inadequate money for education, large classes, etc.). It would be going too far to say 'Fools rushed in where angels feared to tread' - but there is an element of truth in the old proverb as applied to the last decade of curriculum development.

In such a situation, evaluation was not taken very seriously. The developers were confident about the intrinsic worth of new content, and fairly sure, particularly in science, that the right way to teach was to use the inquiry method. But the best of the curriculum developments kept their feet on the ground by organising extensive try-outs of their materials in the ordinary schools of the country. The resulting feedback of information, properly organised and taken account of, ensured that the materials (books, packages, teachers' guides, etc,) were very

much improved and would actually work in the classroom. Thus a kind of ongoing or formative evaluation did take place, and at its very best this ongoing evaluation was both informative and effective.

The curriculum development position in the 1970's and the 1980's will not be so simple. Some of the curriculum developments have failed, at any rate in part, just because they were not fully tested under normal school conditions. And the processes of try-out and feedback are aspects of evaluation. There will in any case be no more easy successes. It may have been 'obvious' that the new mathematics and new science were necessary, and that it was important to spend a great deal of money on refurbishing the content of the curriculum in these areas. It is not now so obvious what to do next for these subjects, and it never has been obvious what to do in the realm of the arts and the humanities. So the role of evaluation is of necessity much more important in the future.

In this chapter we are considering specifically evaluation as related to curriculum development projects. But we acknowledge that evaluation of school systems may well be an important activity in relation to the curriculum of the 1980's.

Most evaluation experts distinguished between the two kinds of evaluation - final or summative on the one hand, and ongoing or formative on the other hand. In the former, which is the classical approach to curriculum evaluation, we must find forms of evaluation that are in accordance with the objective of the curriculum developers. This approach consists of three steps:

1. the defining of objectives in detail with precision and in behavioural terms;

2. the construction of a curriculum, or the planning of learning situations, which are deemed likely to achieve such objectives;

3. the assessment, measurement, or appraisal of how far these objectives have been achieved.

The classical approach to evaluation is well-documented in American literature.

In the Schools Council in England and Wales most progress has been made with regard to ongoing evaluation. A person skilled in psychometrics, and yet at the same time sympathetic to the project under consideration, has been attached to a development team. He acts as a critical friend seeking to make the team define their objectives more clearly, and producing tests and other instruments to measure the achievement of the objectives. At the end of the project it is also possible to undertake a final evaluation to see if the developer has

achieved what he set out to achieve. This final or summative evaluation would still be internal to the project and, as far as the developer's aims and objectives were under scrutiny, its purpose would be to see if they had been achieved.

There is however another kind of independent summative evaluation which considers anew the achievements of the project. For example, two different curriculum developments in the same field of study might be compared and contrasted, and statements might be made about the intrinsic worth of the one as compared with the other. This kind of comparative evaluation is very difficult and certainly involves value judgements. To give one example, in the past ten years a number of independent developments have taken place in the United Kingdom concerning the mathematics curriculum for the ages 16-18 years. Each project has had its own syllabus and external public examinations have been set on these various syllabuses. Little attempt has been made formally to compare the syllabuses, though a good deal of informal discussion has taken place between the different developers and the different Examining Boards. An independent and formal evaluation of the various syllabuses would involve judging the intrinsic worth of certain pieces of mathematics, and the extent to which such elements could be taught effectively in the curriculum.

A further form of this type of evaluation would be that concerned with the wider implications of the development project - for example, a measure of the numbers of people taking up science as a career or an assessment of the attitudes towards science of people who have left school can be considered as an extended form of summative evaluation of a science or mathematics development project.

Some people think it impossible to attempt such an evaluation; others think it is undesirable at the present time. But in the end such an inherent and intrinsic kind of evaluation would seem to be absolutely essential.

It is important also to obtain evaluation data from a variety of sources. Thus, for example, a combination of observation, written tests and self-rating by students will be of greater value than the use of any one technique.

With regard however to the classical approach to evaluation, a number of difficulties can be identified. First and foremost is the difficulty found by teachers and educationists in adequately defining behavioural objectives in sufficiently precise terms. The process is a long and difficult one so that many developers become impatient and desire to take short cuts in order to get to the most interesting parts of the curriculum development. Many intelligent and lively people feel unable

to accept the ideas behind the classical approach and consider that they would always be inhibited in their development work by such a method. A second approach therefore to curriculum evaluation, particularly in the realm of the aesthetic subjects (English literature, music, art, and the humanities) is illustrated by the Schools Council Humanities Project. The project does not deal with overt aims and objectives. Rather it gathers together material in the form of extracts from books, television, radio, and film; or of paintings and tape-recordings all designed to provide 'evidence' on such controversial topics as 'War and Peace', 'Boy meets Girl' or 'Racial Prejudice'. The evidence is then used by a teacher who plays the role of a non-directive chairman to stimulate and intensify discussion in the classroom. Conclusions, if any, are reached by the pupils themselves; they are not imposed by the teacher. In such an open-ended situation it is claimed that the classical approach to evaluation is both limiting and harmful. Because hypotheses are made with regard to the outcomes of exposure to such a stimulus, evaluation will take the form of a careful description of the situation, including an analysis of whether the various hypotheses are confirmed or denied. The advocates of this method claim that it is evaluation since a precise description of outcomes is given, that it is genuine research in that hypotheses are confirmed or denied, and that the method is particularly suited to the Humanities. But a believer in classical education theory is likely to pose such a question as 'What criteria do you use to choose your evidence?' and to go on to suggest that an analysis of aims and objectives would help to clarify the issue!

Levels of Evaluation

Another limitation of the 'classical' approach to evaluation is that, as it deals only with those aspects related to classroom testing, it ignores evaluation processes occuring at other stages in curriculum development which can be of equal importance. In Figure 2, one form of curriculum development is illustrated. Its stages, in sequence, consist of:

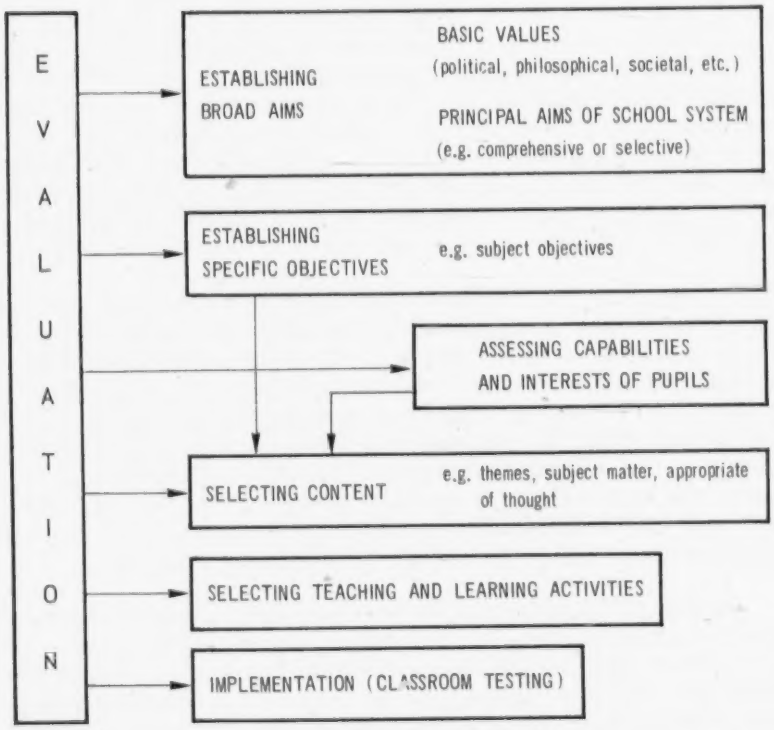
1. establishing broad aims
2. establishing specific objectives
3. assessing the capabilities and interests of pupils
4. selecting the content of the curriculum
5. selecting teaching and learning activities
6. implementation (classroom testing)

Evaluation of various types will be necessary at stages 1-5 as well as at stage 6. For example, surveys to 'evaluate relevant opinion and available facilities will be necessary in order to establish aims, and testing, assessment and observation will be valuable in assessing (= evaluating) the capabilities of pupils.

At different stages, different levels of evaluation will be required involving use of varying proportions of objective data and value judgements.

The different levels of evaluation interact with the stages of development in a complex feedback relation. Thus, not only will the decisions derived from one stage affect the nature of a subsequent stage, it may well affect the evaluated stage and previous ones. To be efficient an evaluation strategy should be based on a consideration of all stages in a curriculum development.

Figure 2. AN EXAMPLE OF EVALUATION IN CURRICULUM DEVELOPMENT



Note: The arrows from the evaluation block indicate the different levels at which evaluation can take place.

Instruments of measurement and assessment

The theory of psychometrics is well developed in the western world. We know a good deal about the most efficient technical ways of developing measuring instruments which will differentiate between individuals. Obviously when they are used for selection and an individual's future is at stake the instruments must be extremely carefully constructed and be seen to be fair to everybody. But when we are evaluating the success of a system of teaching or a curriculum development project, the situation is very different. We can afford to have rougher and cruder instruments, since no one person's future is dependent on the result.

The normal criteria for test construction can no longer be regarded as necessarily relevant. For example, in constructing an objective test which would differentiate between individuals, we usually look for items which a) are important from a subject and content point of view, b) discriminate between the least able and the most able individual in the sample and c) have a success rate of approximately 50%. Theory tells us that a test constructed with such items produces one which is most efficient for its purpose, namely that of differentiating most accurately between the individuals in the sample. But for evaluating a curriculum we may need items in which everyone can succeed since we need to know that we have been successful in teaching an important concept or an important fact. Similarly we may be interested in finding out what is not known and what is not understood, and therefore items which are not answered successfully by anyone in the sample may be particularly valuable.

Consequently, the criteria for the selection of items may be very difficult in the case of curriculum development. We should be able to assemble a whole range of rough and crude measures, attitude tests, collective subjective opinion, etc. We can afford to be rougher and more subjective because the aim is to evaluate the curriculum rather than the individual. The approach required is really that of the systems analyst or the operational researcher. Probably no elaborate, all-embracing psychometric theory will be required. The existing theory is already very sophisticated; possibly it is too elaborate for the rough situations which exist in the world of curriculum development.

Perhaps we should seek to evaluate thoroughly a part of a curriculum development (particularly if it is a diffuse and all-embracing one), so that a least it will be known what exactly is happening in a selected area. Within this area of the curriculum, the evaluator could assemble many tests, a large amount of subjective opinion, objective and quantifiable measures having both a direct and indirect association with the project. The assembled results of all these measures will certainly constitute a kind of evaluation, probably more important than the results to be found from an exploration in depth from a narrowly constructed test of a conventional type.

In curriculum evaluation we are only at the beginning of inventing new procedures. Although we should strive to make our evaluations as scientific as possible we must also recognize the merit of rough and ready procedures. It may be that we could employ a whole series of measures to determine the success of our work, some of which at first sight have only a tangential relationship to our work. For example, measures of the proportion of children staying at school, increasing (or decreasing) numbers studying a particular subject, threatening statements in the classroom, truancy and lateness, numbers of books read, participation in extra-curricula activities, etc. All these could be quantified; taken together, the sum total could add up to an interesting kind of evaluation.

Evaluation and examinations

It is clear that current methods of evaluation, assessment, testing and examination vary between countries. Throughout, however, the problems of examination are closely allied to the problems of evaluation. It has to be recognized, then, that examination systems can be utilized in evaluation studies where appropriate, and that research on examinations should be closely linked with that on evaluation. At the same time it is important that the concern felt by people about examinations which, by their nature involve selection, should not reflect on their attitudes towards curriculum evaluation. This is not concerned with selection and should not make value judgements about individuals.

The sensitivity of pupils, teachers, parents and administrators to examinations and evaluation must be recognized as a major problem particularly within a national context. For this reason, the use of evaluation procedures devised by international bodies should be explored. They may be more acceptable.

Evaluation in a wider context

It is also necessary to insist that evaluation must be considered in a much wider context in the future. What knowledge has the most worth? Which subjects should be taught? Do we need to teach three foreign languages? Is mathematics for everyone essential? What pattern should the whole curriculum follow? Is it more important in country A at time B and in a given situation C to put money into a curriculum development project in history for the ages 15-18, or to put money into a drive to improve the teaching of reading in the ages 7-11?

Curriculum planners are faced with this kind of choice from time to time. Answers to these questions involve a kind of evaluation, and this kind of evaluation will assume greater importance within the next

twenty years. It will involve evaluating school systems as a whole and their effect on the curriculum, as well as curriculum developments per se. It involves taking a long cool look at priorities, at the abilities of men charged with responsibility for projects, at the efficiency of the development project itself, at the extent to which the aims of the project have come to be realized, at the process itself and its outcomes, and at the interaction between the individual projects and the sum total of the whole curriculum. Evaluation in this sense whould seem to need a team of philosophers, subject scholars, administrators, teachers, psychometricians, statisticians, research workers, and, above all, men of common sense.

The training of evaluators

There would appear to be a widespread universal shortage of educational researchers in general and curriculum evaluators in particular. Two types of trained personnel are required: one of a more general kind, with a range of knowledge related to curriculum studies, including an understanding of research design and measurement techniques; the other with a specialized training in psychometrics and other techniques more clearly related to evaluation. In both cases some previous experience of teaching, and/or educational administration is also necessary.

Just as we have argued for evaluation to be considered in a wider context, so we would want all our evaluators to be men and women with a breadth of vision which could only be acquired by means of a breadth of study. We would therefore hope to see an expansion in courses of study in our various countries which would lead to the supply of many more trained evaluators. Such men will be in great demand in the next decade. There should be more courses at the second degree level to meet these needs. It is suggested that those for the generalist could be mainly instructional but that those for the specialist in measurement should include a dissertation on an experimental topic. He would clearly benefit by undertaking a course which demands a substantial element of sustained experimental investigation.

Of course, experience in the role of a critical friend or an evaluator with a curriculum development project would provide valuable training in itself. Even when this role is performed by people whose initial qualifications are less than ideal, the end result may be a well-trained evaluator. It might be possible in certain institutions for a student's research to be associated with a development project, so that a kind of apprentice training is achieved. Such experience is particularly important because it will enable an evaluator to understand the type of personal relationship he, or she, should adopt, and the blend of independence (required for objectivity) and intimate links with a project (required to understand fully what is being evaluated) which are especially important.

It is recognized that communication of the results of educational research to teachers and administrators is often difficult and so training in the art of communication should be an important part of the course for evaluators. But there is another aspect of this problem concerned with the training of teachers. It is important that teachers should understand the work of the evaluators, be able to assist in it, and be aware of the implications for them of curriculum innovation. To meet this need it is recommended that studies of evaluation and information about curriculum developments should be included in teacher education courses.

VI

CURRICULUM DEVELOPMENT AND PROBLEMS OF DISSEMINATION

In this chapter consideration is given to the organisation and methods of curriculum development at national, regional and institutional levels, and strategies for dissemination are discussed. From the outset it is obvious that both development and dissemination of curriculum reform are profoundly affected by the degree of centralization at the various levels of decision making, although it should be noted that some form of centralization exists in all systems even if it is limited to budgetary approval and appropriations.

There is in most Member countries some desire to reduce the time-lag between research and development and a demand for the introduction of change as a planned procedure. A variety of mechanisms for decision making, planning and development may be observed; nevertheless, certain general types of strategy may be distinguished.

Most large-scale research or development work is undertaken under the auspices of a central agency or one or more institutions which can be relied upon to produce the necessary funds either from public or private sources. Moreover, as can be seen from Table 3, such an agency or institution is able to give to curriculum development - and especially to the materials produced - a certain respectability or prestige which is deemed necessary in many countries for the successful promotion of curricular change. Despite its obvious advantages, this form of development suffers from the fact that, being initiated from outside, it is regarded with some suspicion by teachers; in consequence, its acceptability tends to be low. The involvement of teachers in all stages of development from inception to implementation is becoming more widely appreciated, but how this involvement can best be fostered is still a thorny problem to be discussed later in the chapter.

The problem of acceptability of innovation is possibly easier to solve when development takes place at local level, where it is often

initiated by local teachers themselves. Their work is, however, usually handicapped by the inadequacy of financial resources and the lack of any guarantee of wide dissemination of the "product". The latter limitation is understandable enough since local development is often a reaction to locally perceived needs which are not necessarily nationally perceived needs. Development which stems from what is believed to be a national crisis (e.g. the effect of the Sputnik scare in the USA in 1957) presents much better opportunities to harness national effort in an atmosphere favourable to change. There remains, of course, the problem of what kind of development model is best suited to the specific subject area e.g. whether an open ended approach is more useful or whether it is better to define objectives more explicitly.

In view of our limited knowledge at present, statements regarding the suitability of any of these approaches are at best a matter for argument. Few case studies exist, and even fewer with any critical evaluation of the factors contributing to success or failure; much less is there any systematic effort to test alternative approaches under known field conditions. In Table 3 an attempt is made to estimate the degree of success likely to accrue from development originating at various levels.

Dissemination - Some practical examples

Against the theoretical background of these various models, some examples of successful dissemination procedures adopted in the United States may be noted:

- a graduate programme leading to a master's degree for principals of a single school district, in which after two summers and intervening part-time work, principals execute, under supervision, a curriculum development project;
- a systematic programme to reach all teachers in a national system on a rotational basis at five year intervals, supported by the provision of five free school days per year for professional development;
- a consultant working with individual teachers in a particular subject area; together they will analyse needs, set goals and procedures for achieving them and determine methods of evaluation in order to assess progress;
- improvement of mathematics teaching through a three-year programme in which curriculum development specialists first train a selected group of teachers in a summer programme, assist them in the following year to train a second larger group

Table 3. ESTIMATED DEGREE OF SUCCESS OF DEVELOPMENT ORIGINATING AT VARIOUS LEVELS

Curriculum Materials	When control over development is			
	Central	Mixed	Local	External
Quality	High to average	High to average	High to average	High
Acceptability at school level	Low	Low to average	Average to high	Variable
Stimulation to programme development	Cyclical	Variable	Low	High
Suitability	Average	High	High	Low to average
Permanence	High	Average	Average to low	Low
Costs development	High	Average	Low	High
Dissemination training	High	Average	Low	Average
Per pupil	High	Average	Average to high	Average

and them gradually withdraw in the third summer when responsibility for training is shifted to the school system.

On a rather different level, two other experiments may be mentionned. In one experiment, junior secondary teachers of limited scientific knowledge received assistance by means of a travelling laboratory in which workshops were held. In the other experiment, again concerned with science, a small scientific reference collection was circulated to schools which served the dual purpose of providing schools with a temporary library and of acting as a guide for purchases to the science section of the school library.

Curriculum development - some critical points

Quite apart from the general problems of curriculum development, there are specific critical points within any system which require particular attention irrespective of the general approach adopted. Procedures for dissemination will not be effective unless they form an integral part of

the development programme and unless they take into account the diversity of educational settings and the automony of decision makers at different levels of the system. It follows, therefore, that curriculum developers must understand the environment in which the programme will be used, appreciate the individuality of schools and recognize the importance of teacher involvement. Unquestionably, the two most important factors affecting the long term success and wide dissemination of curriculum reform are, the response of teachers to curriculum development and the intensity of its demands on the schools. These two factors will be considered in turn.

On the one hand, although some degree of charisma from a body external to the school may be necessary to stimulate re-theoring, there is a tendency in development exercises for teachers to invest the development team with the kind of authority which can atrophy independence of judgment in the individual school setting. Once the exercise is under way, however, teachers may come to rely too much on this authority instead of approaching innovation in a critical spirit. At the same time, the team's obvious concern to impart an understanding of procedures as they relate to theory can release the professional judgment and imagination of teachers.

On the other hand, in some teachers the development team's work creates anxiety about the effacement of personal style; this could be the result of mandatory or narrowly interpreted specifications of method. To allay this anxiety, it must be made clear by the team that curriculum development is capable of being tailored to the circumstances and temper of particular schools and of individual teachers.

Moreover, developers and teachers often assume that the values of a development programme are intrinsically good and that it is the task of the school to make the programme succeed. Unless this assumption is openly challenged, a development team, relying during the preliminary trial period on feedback from teachers, will receive misleading reports because teachers interpret difficulty as a reflection on either their own competence or on the efficiency of the programme, instead of regarding the difficulty as an indication of the need to modify the programme's aims or methods of application. The burden of completing report forms in order to provide feedback appears to produce in some cases unfounded feelings of incompetence and anxiety. Developers must make it clear that they are the learners and the school is the teacher.

To turn to the second factor, namely the intensity of the demands made upon the schools by the development programme, the team must appreciate the importance of keeping close to the actual working conditions in the schools. They must also be able to estimate the extent of the human variables (teacher ability, anxiety, concern, motivation and

expectation) and of the situation variables (the ethos of the school and its organisational pattern). In particular, where curriculum development postulates a change in student/teacher relationship, for example from a formal attitude to an informal one, developers need to assess the existing nature of this relationship. To do this effectively will require a clear understanding of the king of discipline in force at the school and of the probable effects arising from a basic change in ways of learning.

It may be advisable to distinguish between the reactions of headteachers and of teachers to innovatory programmes. From headteachers, who are such key figures in the school, effective curriculum development requires not only good will but also understanding, so that they can make appropriate choices in terms of staff, material resources and organisation. They also need to be sensitive to the tensions that arise in the process of innovation and to support, without dominating, teachers taking part in new programmes.

As to the teachers themselves, any experiment which demands an unlearning of long established habits and accustomed practice will arouse an initial diffidence and a feeling of insecurity. To overcome there reactions, the development team must devise ways of encouraging teachers and of inspiring confidence: one effective means of achieving this purpose is to provide facilities to meet colleagues involved in similar curriculum experiments at other schools. In addition, teachers should be helped to interpret the feedback from their own new practices and to realize that constructive self criticism is essential to curricular reform.

Procedures recommended to prevent distorsion

When a new curriculum programme is first disseminated, it is exposed to various hazards. An obvious danger is a deterioration in understanding as new material and ways of using it become more remote from their originators and from the schools initially involved. To counter this hazard, the development team must give careful consideration to the language in which the programme is described: they will need to check that no trace remains of the specialized meaning of words and phrases - the jargon which inevitably grows up between the planners and their teacher partners. No standardized methods are available, no commonly accepted terminology yet exists to convey to headteachers and local authorities the background they need before they can make necessary decisions about the use of new programmes in school. In the absence of a vocabulary of this nature, planners need to be alert to possible sources of failure in communication.

An even greater threat to the efficient implementation of a project arises from lack of clear appreciation of its objectives and procedures

in the ever widening circle of schools which introduce it. It is rare indeed for safeguards for quality control to be introduced into schools: a project cannot be withdrawn from a school which in the opinion of the planners is distorting their purposes. Because there are no safeguards of this kind, developers have the heavy burden of providing appropriate training for users and for instituting effective after care.

As the central development team has only a limited life span, major responsibility for continuity and revision has to be invested in some other body, for example a national centre or a teacher training institution or even ad hoc groups, based on teachers'centres. It would be advisable for the team to be consulted when its work is nearing completion as to the body most appropriate for undertaking such responsibility.

The nature of the preparation and training required by teachers who are to take up the project when it is widely distributed is crucial. Various possibilities are open. Teachers working in participating schools on the initial stages of a project could train other teachers - even though they are not necessarily as effective as trainers as they are in the classroom. Alternatively, a number of teachers could be specifically trained in the art of training other teachers to use new materials and methods. Either procedure might involve a "facilitator" in each school to help train and support colleagues on the staff or a nucleus of trainers to assist interested teachers on an area basis.

The whole matter of retraining in relation to curriculum reform prompts a number of questions which have yet to be answered satisfactorily: are intensive courses more effective than extended courses over a longer period? What rewards should there be for those teachers who assist with the training of others? How can headteachers and local authorities be made aware of the need for release time for teachers participating in curriculum reform? It has already been remarked that such time is necessary to enable teachers to meet colleagues similarly engaged in curriculum change elsewhere, as well as to discuss problems that arise within the school. The teacher willing to change his attitudes and methods after many years of traditional teaching also needs time to study and reflect.

Curriculum development depends, in the final analysis, on the personal and professional development of teachers. To achieve this, in-service training (with its implied acceptance of the authority of the developers) is less significant than in-service education. The overriding aim must be to encourage teachers to consider for themselves the changing educational needs not only of those students now at school but also those who will be at school in the 1980s and beyond.

VII

CONCLUSIONS

Planning a curriculum for the 1980s cannot begin until consideration has been given to those changes in the framework of society that are likely to influence schools. While it is impossible to foresee the nature of such changes in detail, it is reasonable to assume that for the most part they will have their origins in present trends. Acting on this assumption, all the Workshop groups in preparing the chapters for which they were responsible took into account the following major trends in the political, economic and social life in Member countries:

- public interest in education has manifestly increased over the past couple of decades; this interest has been reflected in the growing concern of politicians for equality of educational opportunity, for an extension of schooling and for expansion of further and higher education. In all Member countries educational advance has been accompanied by a continuous rise in the cost of education considerably in excess of the growth of national income. Because education is likely to continue to need a growing proportion of public expenditure, financial considerations will increasingly influence decisions in the provision and organisation of education.
- as there is no indication that the rate of change in industry and commerce will slacken in the foreseeable future, the need for a more adaptable work force will lead to a greater emphasis on general education and on methods designed to develop positive attitudes to learning rather than on the acquisition of knowledge.
- the increasing dissatisfaction of students over their exclusion from decision making in a society which they regard with considerable criticism will lead to changes in the patterns of authority in schools and colleges.
- the decline of elite education and the emergence of mass secondary and tertiary education will have a profound effect on every aspect of the curriculum.

Within the agreed framework, the Workshop studied various aspects of curriculum change. Starting from different positions and adopting different approaches, the groups reached conclusions and recommendations which reveal a remarkable concensus. It seems sensible, therefore, to collate the major points of agreement rather than to summarize the separate conclusions of each group in turn.

1. Teacher participation

Teacher involvement was seen by every group to be a crucial factor in facilitating curriculum reform. With striking exceptions, teachers share with members of all professions a tendency to be conservative in outlook and a reluctance to adopt radical change. Yet every member of the Workshop was convinced that any attempt to bring about change without the willing co-operation of teachers would be utterly ineffective. To secure this co-operation and to win their support for reforms that are necessary to meet the needs of education in the 1980s, it will be essential to ensure that there is a two-way relationship between teachers and curriculum developers. No less significant for success is the provision of in-service education for teachers on a systematic and regular basis. Specific recommendations were:

- arrangements should be made for courses in school time as well as in vacations to help familiarize teachers with new developments.
- trainers of teachers should themselves be periodically re-educated.
- teachers should be active participants in courses.
- facilities such as teachers' centres should be established for discussion and co-operation among teachers in the solution of practical problems.
- research and development work should be undertaken to improve in-service education both for teachers and for non-professional staff.

2. Changes within the school

Recent changes in the boundaries of knowledge suggest that the traditional dozen or so subjects hitherto pursued separately will be more closely integrated. A core curriculum is likely to emerge, consisting of the natural sciences (including mathematics and technology), the social sciences (in this field economics, psychology and sociology will probably be added as being relevant to an understanding of society), and the study and practice of communication and the expressive arts. In the later years of school life, more options will become available. A simple model, exploring possibilities for cross-linking these three areas,

is presented in Chapter II as a tentative guide for planners in the coming decade.

A greater variation in the groupings of children and teachers and in the allocation of time will accompany changes in the content of the curriculum: to secure the maximum benefit of this new flexibility systematic planning will be essential. Closer analysis of the complex but important objectives related to students' attitudes and personality will also be required. Formal teaching will become less important than independent learning - an approach which places greater responsibility upon the individual student. As a starting point for further work along these lines, one Workshop group constructed a classification system of teaching/learning methods (see Fig. 1). Application of this system underlined the contention that some methods and media are more suitable for certain subject areas and more appropriate for particular age groups. Concern for individual learning differences will make the situation even more complex, since certain individuals learn more easily from particular styles of presentation which do not suit others. A large range of alternative materials covering the same basic themes would seem essential in this situation.

Emphasis on learner-based rather than teacher-based methods, takin in conjunction with a fuller consideration of educational objectives, will lead to relationships between teachers and students of a very different character from the traditional one, in which the teacher is regarded as the sole purveyor of knowledge and the sole source of authority. But however changed, the role of the teacher will be in no way diminished: his concern, a critical and demanding one, will be the management of the learning process and of the resources required to make it effective and relevant to individual requirements.

3. The place of evaluation

Evaluation, which played only a minor part (largely restricted to trials in and feedback from schools) in curriculum development of the 1960s, will unquestionably accompany future change: for without it progress would be limited and uncertain. Its scope must be enlarged to take in all aspects of the teaching/learning process, so that better informed decisions may be made on school systems and the patterns of the whole curriculum as well as on the worthwhileness of particular developments in specific areas.

The Workshop considered in some detail the classical form of evaluation which is limited to a final or summative assessment, and recommended that it should be supplemented by ongoing and formative procedures, even though by including value judgments these may lack the apparent precision of classical methods.

In this neglected but important field, the Workshop believed that governments should take steps to recruit and train evaluators with teaching experience (for example, by encouraging courses at second degree level). But without the inclusion of some study of evaluation in the initial and in-service education of teachers, the work of experts will be of little value.

4. Examinations

Closely allied to evaluation, indeed one aspect of it, is the subject of public examinations. To the majority of students, teachers, parents and employers, examinations are at present the only valid criteria of educational success. Yet in all Member countries their place is being progressively challenged: they are inexact predictors of future performance: they exercise a restrictive influence on the introduction of new content and methods: above all, they focus attention on what is examinable to the detriment of other even more important aspects of education. Despite this formidable indictment, the Workshop recommended not the total abolition but rather a drastic reappraisal of examinations, with greater teacher participation in the form of continuous assessment and preparation of individual profiles of students, together with measures (such as closer co-operation between schools and universities over entrance procedures) designed to diminish the influence of public examination hurdles.

5. The school and the community

In the 1980s the school will no longer operate in isolation from the community whose children it serves. Demands by adults for a share in the government of the school and in the use of its costly and varied facilities will become more insistent. The Workshop, envisaging that school-community complexes will be utilized for 14 hours a day and six days a week throughout the year, recommended that:

- planning of new schools and modification of existing ones should take account not only of the greatly increased flexibility required by curriculum developments but also of the need to create an institution designed to serve the wider community, for example by arranging for joint use of catering facilities, of playing fields, sports halls and swimming pools, by the addition of a public library and of rooms for various social and welfare services.
- detailed consideration should be given to the implications of the new role of the school in the life of the locality, for example, methods of integrating the staff, professional and non-professional, into a single team.

- changes in methods of financial control so that the school's resources can be considered as a whole and not under various administrative headings. Provision should be made for flexibility in the management of the total budget for the school/community complex.

6. Strategies for dissemination

Innovation strategies are bound to vary according to the degree of centralization in the educational systems of Member countries. In highly centralized systems, the problem will be to avoid imposition of change from above, i.e. to devise ways of involving teachers at all stages of curriculum reform. On the other hand, where decision making is diffused and the curriculum is seen mainly as the responsibility of the teacher, procedures will have to be formulated for promoting planned developments. In educational systems of this nature, regular and sufficient funds must be available for large-scale and costly development centrally as well as for substantial development locally. Methods of financing must also enable schools to invest in new materials and media.

The Workshop wished to call attention to the danger to which all curriculum reform is exposed, of distortion and dilution as new methods and materials become widely disseminated. Unless there is continuous revision and renewal, there is a tendency among teachers to lose sight of the fundamental principles and practice underlying reform. In order to counteract this tendency, the Workshop recommended various lines of action aimed at improving communication between developers on the one hand and teachers and trainers of teachers on the other.

For effective dissemination, as indeed for all aspects of curriculum reform, the Workshop participants were convinced that, while decision makers at the national, local and institutional level have an important role, the key factors are the attitudes and the knowledge of the practising teacher.

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